IQLR
International QL Report

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IQLR.....

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We welcome your comments, suggestions and articles. YOU make IQLR possible. We are constantly changing and adjusting to meet your needs and requirements. Articles submitted for publication should be on a 3.5" disk in Quill or Text87 format. To enhance your article you may wish to include Saved Screen dumps. PLEASE send a hard copy of all screens to be included, don't forget to specify where in the text you would like the screens placed.

Article and Advertising DEADLINES are as follows:

Issue 1	10 April
Issue 2	10 June
Issue 3	10 August
Issue 4	10 October
Issue 5	10 December
Issue 6	10 February

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Advertisers.....

"The Definitive Information Source"

Documents in Text87

Geneva, SWITZERLAND - Ian Pizer

How to design your documents:

First some Definitions: I am using Text87 Plus4 (my copy is version E4).

Your Document can consist of one part or be broken into parts called SECTIONS. LAYOUT(s) for your document PAGE(s) can have one or several FRAMES (rectangles) into which you wish to put the SECTION(s) of your document. Each PAGE of the final document can have the LAYOUT that you choose.

Brief Explanation of the Procedure:

1. Write your text in Text87
2. Define Sections using "F3 Doc textSections New"
3. Define Layouts with "F3 Layout ..."
4. Connect Sections and Layouts with "F3 Layout Edit textSections"
5. Check result with "F3 Print preView"

The following explanation has been written because I found that the Text87 User's Guide and my brain were not in tune for the exercise of designing a document. The information is all there in the guide but spread out, so I have written below how to do it in a way that suits my brain and perhaps other brains too.

First do all the typing including special parts like headers and footers for your document.

Now separate the parts (SECTIONS):

Place the cursor on the first line of a part you wish to define as a Section and do "F3 Doc textSections New" ESC ESC. You have defined the beginning of a Section and a solid line appears at the beginning of the Section. Repeat the same process for other parts (Sections).

Section dividing and the solid lines can be removed with "F3 Doc textSections Merge" which merges (joins) the adjacent Sections.

Now you can define the kind of section (TEXT TYPE):

If you have a header or title or footer which should repeat in several pages you want to make it REPEATED. Otherwise (for continous text) it should be FLOWING. So do "F3 Doc textSections Text type" ESC for each sector.

The LAYOUT:

Do "F3 Layout" to get the LAYOUT EDITOR and you see a FRAME which surrounds most of the paper, the size of which has previously been defined by print Offsets ("F3 Config Driver Offsets"). If you want a second (different) Layout use "F3 Layout New layout". Layouts a re numbered from 0 upwards.

FRAMES:

You can modify the size and position of a Frame, or have several Frames in a Layout. To Edit a Frame you move the top with arrows and similarly for the bottom after TAB ending with ENTER. If you want to define a second (or more) Frame(s) do "New frame Resize". Relevant dimensions are indicated for each frame. If you vertically split a Frame with "F3 Layout Edit Columns" you must adjust the width of text for the columns, using Ruler.

The LAYOUT Windows:

There are 3 windows - the left windows shows the FRAME(s) for the present Layout. The top right window shows how many Layouts you have made, numbered from 0 onwards. For each Layout its Frames are shown in the lower window each line gives the Frame Number (the first digit), the second number is the Sector Number, then the "Text

Documents in Text87 - (CONT'D)

type", Frame size, and top left coordinates. You should check these lines once you have done the attaching, see below.

Attaching SECTORS to FRAMES:

From "F3 Layout Edit" choose a Text Section using arrows (press "Resize" to see which Frame you have chosen), then do "textSection". You now get a new window showing the Text Sections which you can now choose (use arrows) to correspond to the desired Frame. Press ENTER to attach. Now choose the next Frame and continue the attaching procedure till wanted Sections have been allotted a Frame. You have now completed the Layout procedure for one page. If you now do "F3 Layout" you see how the Sectors and Frames are attached in the lower right window - for example, "0 1" means Frame 0 attached to Section 1 .

More than One PAGE: Do "F3 Layout Repetition" to get the choice of:

"FIXED" for deciding how many pages will use the first Layout.
Or "CONTINUOUS" to use the same Layout for each page.
Or "ALTERNATE" which will alternate between two layouts - this necessitates 2 Layouts being designed.

To make a second or more LAYOUTS: "F3 Layout New layout" and prepare a new Layout as before.

Now check the whole Document: "F3 Print preView" to see the first page and "V" for subsequent pages. Check the lower right window of the LAYOUT EDITOR for the correct attachments for each Layout.

In Editor mode, put the cursor in each Section and note the information in the box at the bottom of the page where you can see the Section number, The Page number is followed by 2 other numbers separated by :. The first corresponds to the Layout number, the second is the Frame number in that Layout. You will need to change the size of Frames if the text overruns the Frame on the right side (check with "preView") - increase Frame width in the usual way and the document will be corresopndly reformed, or use "F3 Layout Edit" to reduce the text width.

It is possible to have text which is ignored (no Page number, and a page break shown). This indicates that some text cannot fit into the frame so you need to lengthen the Frame. I hope the above makes document designing a delight.

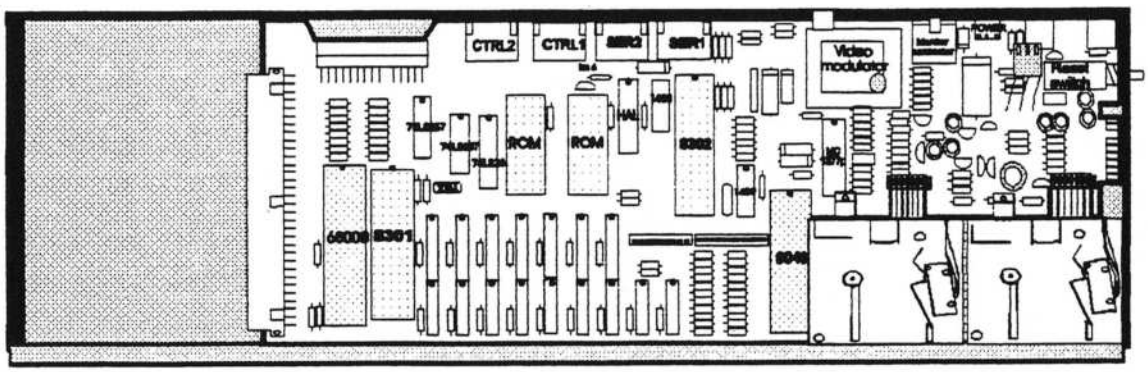
REPAIRING THE QL

Admaston, Telford, GREAT BRITAIN - Dennis Briggs

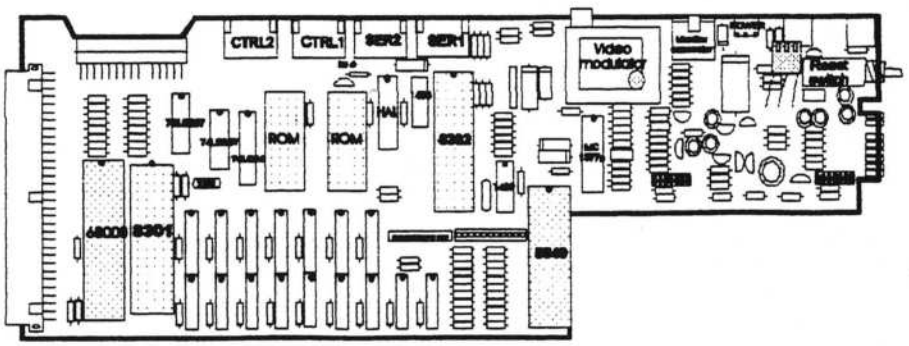
Introduction

The QL computer is a comparatively easy machine to repair as most it's functions are controlled by specially designed ULA integrated circuits.

These special chips with a 68008 CPU and a preprogrammed co-processor are fitted in sockets, making for ease of replacement. The two chips making up the ROM are also socketed except for early machines where they consisted of 3 Eproms two of which were soldered together piggy back style. Much later came two alternative ROMs from other sources consisting of a 27512 EPROM on an adapter board. None of the integrated circuits are particularly expensive leading to the practice of swapping chips around in the vain hope that it may make the machine work. Such methods of hit and miss experimenting can prove to be both expensive as well as time consuming with the added danger of further failure due to mishandling.



Internal view of the QL with the keyboard lifted



QL board out of its case.

Over the years there has been many additions to the QL from third party suppliers some of which were more successful than others. However these notes are restricted to the standard QL as supplied by Sinclair Research with no additions of any sort.

Information sources

A Service Manual was available from Sinclair written by the QL manufacturers Thorn EMI. It started out as notes made by the production staff at Feltham for internal use. Whilst covering the main items it is unsatisfactory from a diagnostic or repair point of view. A large section is devoted to microdrive servicing for which parts were not available plus irrelevant board modifications.

REPAIRING THE QL - (CONT'D)

Errors abound in many sections notably in the circuit diagrams. No updates have been made available since the first reprint either officially or via the user groups. Any repair organisation amasses much practical information during their work. This information is usually recorded for for later distribution perhaps on a cost basis.

A few hastily prepared news sheets emanated from Sinclair in the early days of the QL directed at the trade but are now lost in time.

These notes have been compiled in an effort to redress this imbalance. The primary aim being to meet the needs of QL owners who wish to keep their machine operational for several years to come.

The QL add-on manufacturers never officially released any information especially in diagrammatic form in regard to their products. However there is some information around from several sources which goes part way to resolving the problem. It is understandable for small companies to withhold detailed information whilst they actively support their products but when this service ceases one would have hoped that data sheets would have been available to ensure the customers investment was protected.

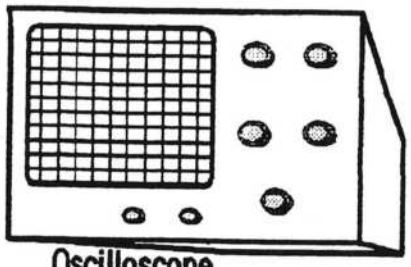
Workshop

Obviously a certain amount of electronic knowledge and skill will be required but the main basic ones needed are an ability to work neatly and precisely, an ability to desolder and solder small items. The ability to follow instructions is implicit in all repair procedures but in many instances the information is shrouded in so much technical jargon it is difficult for mere mortals to understand. Clear logical thinking as opposed to random guesswork is also a great asset but often this is in short supply. An ability to insert screws into comparatively soft plastic without stripping out the recess is vital. In the absence of these vital practical skills and a willingness to practice them if they have not been used for decades or attempt a quick fix will quickly consign the QL to the scrap pile.

As a preliminary step, it is preferable to prepare the work area to suit your own particular methods. It is not necessarily the layout bystanders may expect to see only they either cannot or will not be doing the work. The majority of electronics repair people I have encountered describe their work place as a tip. Mine is a bit different on occasions after my wife has tidied it up. It stays like this for at least part of a day then deteriorates to the comfortable.

Workshop equipment

1. RGB TTL colour monitor.
2. Colour TV.
3. Black and white monitor.
4. Digital multimeter
5. Low voltage soldering iron and fine solder.
6. De-soldering equipment.
7. Serial loop back cable.
8. Set of known, marked plug-in ics.
9. Plug-in ROM board with self starting MG ROM.
10. 10Mz or better oscilloscope.
11. Known fully functional power supply.
12. Supply of replacement parts.
13. Magnifying glass.
14. New top quality cross head screwdriver. Not Phillips.
15. Service manual or at least the circuit diagrams.
16. Antistatic storage for ics.

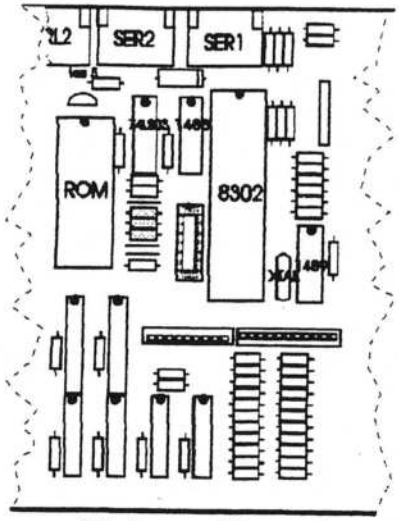

Oscilloscope

Types of board

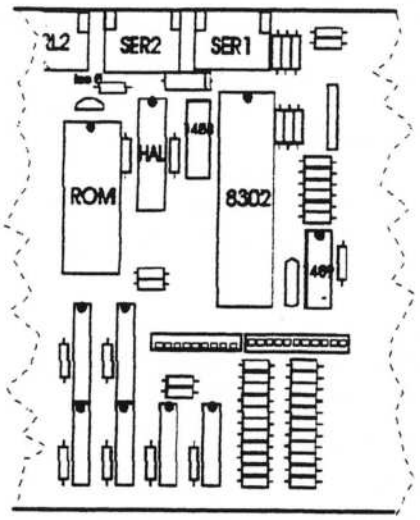
The main QL board has undergone several production changes from issue 4 to issue 7. Almost all those encountered will be Issue 5 or Issue 6. Issue 4 boards can be consigned to the scrap box as they were simply production prototypes beset with many problems.

REPAIRING THE QL - (CONT'D)

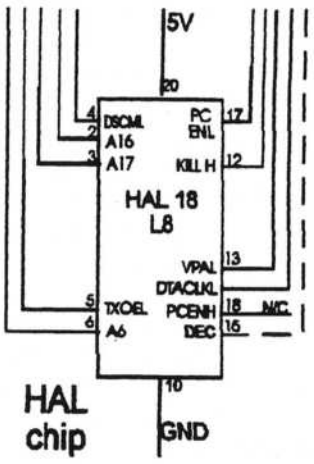
The change from Issue 5 to Issue 6 was accompanied by a tidying up of the layout, use of a HAL chip to replace a couple of logic chips and a sort out of the microdrive head board. Unfortunately Sinclair still managed to get the microdrive head board wrong with it needing track cuts and bits of wire to get them to work. Issue 6 boards from Samsung also differed in the types of connectors used whilst incorporating many detailed RFI suppression modifications. Again no official information has been made available therefore any details I mention have been derived from my own personal contact with the many Samsung built versions of the QL.



QL Issue 5 board



QL Issue 6 board

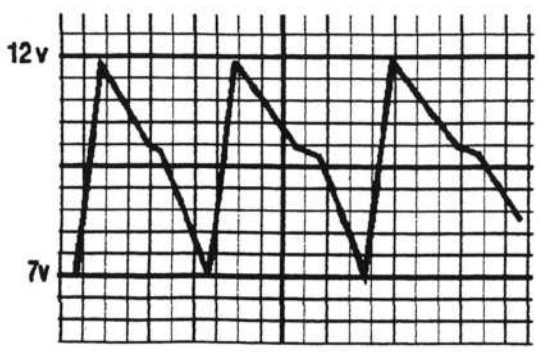


The Feltham factory did many reworks on the Samsung QLs in an attempt by Amstrad to get rid of the things. There are at least three different versions of these machines that I have seen and there may be more. Main boards are marked just below the serial ports with the Issue number. Issue 5 boards have a socket or location for logic to decode the EPROM ROMs. If you wish to experiment with different code for the ROM then it is easier to use an Issue 5 board.

Power supply

The QL power supply was compromised in the design stage by the main criteria being that it had to fit in the same casing as that for the Spectrum power supply. This had the effect that everything was squeezed in making the unit run hot with adverse effects on the internal control electronics.

With such a restrictive casing, Hinchley had to develop a compromise circuit where the output load is sensed switching in an extra winding on the transformer as required. A thyristor carries out the switching function at mains frequency but there is no space for components to be fitted to reduce the transients so created.



Power supply waveform

It is clear from observing the output waveform that the 5 volt regulator inside the QL will be heavily loaded as it is being fed a nominal 9 volts with several volts of triangular ripple superimposed. This frequently pushes the original 7805 regulator to or beyond it's operating limits resulting in machine crashes or worse still component failures. As the temperature rises the regulator becomes less tolerant of supply fluctuations thereby compounding the effect of it being fed very raw dc.

Changing the 7805 for the more robust and tolerant 2 amp 78S05 with its improved specification ensures that the regulator functions well within its limits. However to sort out the problem, either modify the existing power supply or preferably fit a new one designed to provide a smooth 8 volts dc. Reduction of the dc ripple by a factor of 1000 is achievable with a very marked improvement in reliability.

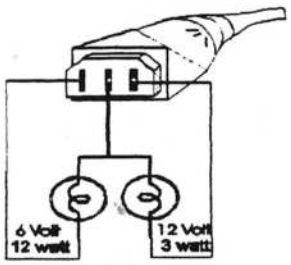
REPAIRING THE QL - (CONT'D)

The standard power supply provides a nominal rough 9 volts dc also 44 volts peak to peak ac which is manipulated inside the QL to supply the +/- 12 volts for the serial ports etc. Any replacement power supply unit must therefore provide BOTH a dc and an ac output. Use of a switch mode power supply unit may appear to be attractive but I have found that they can cause more problems than they cure. Whatever power supply is used then it must be sited as far away from the QL, monitor, TV or disc drives as possible. The best place is on the floor well out of harms way. Two thermal fuses are incorporated in the standard power supply unit hiding away under the transformer winding covering. They are there for your protection in reducing a potential fire hazard.

They must not be bridged out but can be replaced with a later type of thermal protection. If either of the thermal fuses has failed then the cause must be investigated. Normally it is the fuse on the supply to the +/- 12 volt section that fails usually due to the 79L12 regulator on the main QL board going short circuit. Instructions for fitting thermal fuses state that they must be crimped or screwed in place. This is a bit of pie in the sky advice, from a servicing aspect, easily overcome by some thought. Just pop the fuse in the deep freeze over night along with a pair of pliers. Grip the frozen fuse with the frozen pliers and solder very fast. If you are not quick you will thermalise the fuse and scrap it.

A stop gap measure to reduce the ripple on the supply can be employed by threading the power supply lead around a ferrite ring. This modification is incorporated inside the Samsung built QLs. If the QL is going to be used permanently with any type of add-on card then the thyristor in the power supply can be permanently bypassed to give a much smoother output. It must be stressed that any work on the power supply must only be undertaken by those having sufficient skills and knowledge to work safely. Remember MAINS VOLTAGES ARE LETHAL also an overheating power supply could BURN YOUR HOUSE DOWN. I have seen one QL power supply with holes drilled in the casing for ventilation. Little heed was given to safety as any spilled liquid invited disaster. The perpetrator did say that he used an electric drill to produce the holes whilst the power supply was PLUGGED IN THE MAINS.

Check the power supply on load before tests commence on the QL. The reason for this is that you must have a known starting point. Scrutinise the inside of the mains plug screwing up the two connections tightly. It is possible to go one step further by soldering the connections up permanently. The cable clamp if fitted is there for your protection so use it. Many complaints about unreliability have been traced to problems with the customer fitted mains plug. Some 9 years on after the original design for the QL power supply we would see a fused moulded on mains plug fitted to the unit. If in doubt fit a new 3 pin plug or better still a new mains lead with a moulded on plug.There are other electronic items in the power supply case that cause many problems therefore you must make sure that the unit you are using is functioning correctly. It is possible during a quick check with a digital multimeter for the voltages to appear to be about right only for them to drop drastically when the unit is subjected to a load. Use a couple of 6 watt bulbs across the outputs to check.



Powe supply test

Initial checks

With the power supply confirmed as 100% functional, test the QL in the state it is received. Personally the first thing I do on opening the packing is to clean the machine with a disinfectant spray before any handling or testing is commenced.

This procedure was initiated by me after encountering several of the most horrible gunged up units you can imagine. I have had a QL brought in covered in cow dung whilst another was so badly caked with unknown dirt and grease it had to be handled with protective gloves before being scrubbed clean. Any owner's remarks can be noted but I find these usually tend to mislead rather that inform. Do not dismantle anything at this stage but just plug a cleaned QL into a TV, power up and test all of the machine's functions. If it doesn't work on a TV then try it on a monitor.

Does the screen light up in any shape or form ?
Is the orange power LED ON ?
Does the QL respond to a key press at the F1/F2 prompt ?

REPAIRING THE QL - (CONT'D)

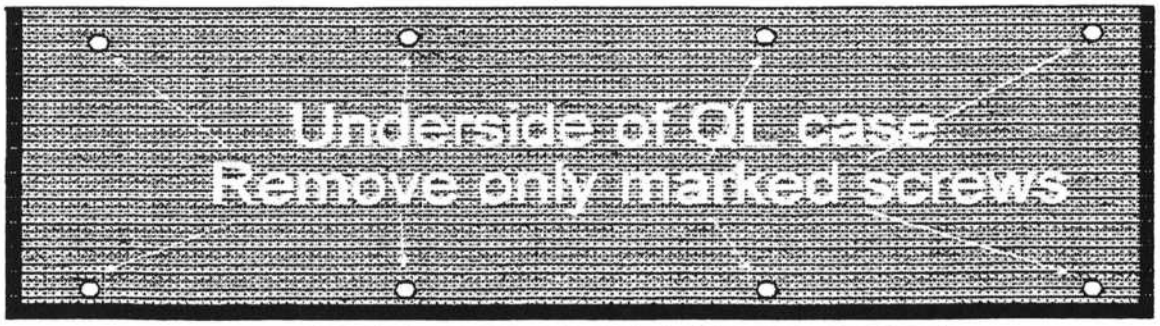
Are the microdrives constantly spinning after F1 or F2 is pressed?
Does it make funny noises in the loudspeaker ?
Are the microdrive lights on all the time ?

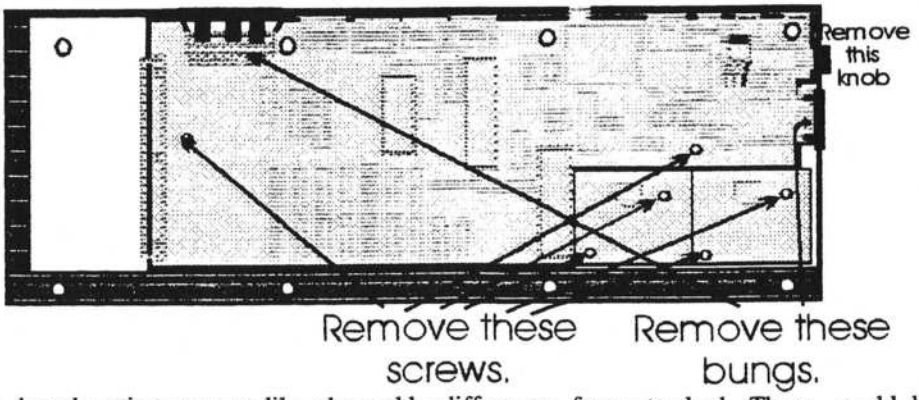
Make a note of what you have discovered also how many screws are still present. Give the power lead a wriggle where it is plugged in the QL as this is a section regularly subjected to harsh treatment due to the absence of a mains switch. The plug on the end of the power lead where it enters the QL is of the standard 0.1 inch pitch but of a unique shape. The leads are of Phillips manufacture. This particular Phillips was a small injection moulding company in Honiton Devon, not the big Dutch Phillips.

Dismantling

LED connections

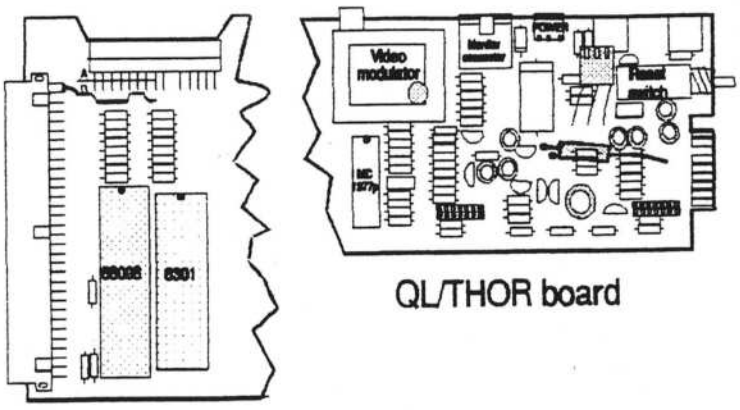
With your note pad at the ready, invert the QL and remove the eight screws marked on the diagram then turn the QL the right way up. Raise the keyboard until the membrane tails can be grasped between finger and thumb then pull gently upwards. Make a note of how the LED wires are connected and check the six LED connections as one stray strand of wire or one wire floating about will cause all sorts of random problems. Ease the socket upwards to remove the six wires then lay the keyboard to one side suitably marked.





Examine the QL board noting any readily observable differences from standard. These could be switching regulators, keyboard interfaces, mice interfaces, internal expansions etc. It is totally futile exercise to start to looking for visible signs of damage such as charred components or cracked boards. If you find anything of this nature just throw the QL in the bin as it is beyond repair. The initial aim is to get a standard QL using standard Sinclair chips functioning as a starting point. No microdrives, no add-ons, no keyboard. Just a main QL board with all the chips in place. Being somewhat cynical from years of experience, I remove as many 'enhancements' as possible then try again.

It quite often works indicating that the problem is in the item just removed. If you are working on a bare board of unknown origin then do have a careful look as it could well be one from a THOR. This is identified by the three nominal 9 volt lines on the 64 way connector being soldered together then taken to an adjacent 5 volt track also the +12 volt regulator is replaced with a large 10 ohm resistor.



QL/THOR board

Carry on in removing the ROM slot plug, microdrive extension plug, knob from the reset switch, two screws from the top of each microdrive plus one underneath. If you are lucky removal of the reset switch knob is easy but often this process pulls out the complete internals of the switch destroying it in the process. The safest way is to insert a thin screwdriver between the black knob and the red switch slider prising the two apart very gently. The heatsink and regulator can be removed as separate items but if the 2 screws holding in the main board in place are withdrawn along with the three screws holding each of the microdrives, the whole assembly can be lifted out. When removing the screws make a note of their lengths as they are all different. It is vital that they are located back in the correct positions on reassembly if damage to the casing is to be avoided. Push in the reset switch then lift out the complete assembly including the regulator and heatsink. Put the bottom casing to one side suitably labelled. The two microdrives can be left attached to the main board to be unplugged later for easier access. With the bare bones on a non conductive surface, remove all the socketed chips leaving just the 7805 regulator in place then plug in the tested power supply and carry out voltage tests at these points.

MC 1488	MC 1489
Pin 1 = -12 volts	Pin 1 = +5 volt
Pin 8 = Gnd	Pin 14 = GND
Pin 16 = +12 volts.	

Have a wriggle at the regulator socket on the three bits of wire. If the QL resets with this treatment then remove the plastic housing and solder up the three connectors. Clean up the contacts, spring out the tags etc. and refit. Whilst you are working on this item, fit ferrite beads to the three wires to reduce RFI thus helping reliability. The connector to the regulator gets very hot causing the plating to tarnish also weakening the contact tension.

Sometimes I have found the regulator is not in direct contact with the heatsink as some non-thinking person has fitted a small washer between them effectively destroying the essential thermal path. The washer must go on top of the regulator with smear of thermal compound on between the regulator and the heatsink.

A standard QL will only run for about half a minute if the regulator has no means of dissipating it's heat. For test purposes I have a 78S05 regulator screwed to small finned heatsink enabling a fully expanded QL to run indefinitely. One QL I received, had the regulator covered in thermal compound as was the whole of the heatsink. This resulted in overheating as the compound reduced the radiating capacity of the heatsink causing the regulator to shut down at frequent intervals. A good clean out of the white nasty stuff making sure just a smear remained under the regulator had that item running reliably.

With the voltages correct, power down then insert a 68008 CPU, 8301 and a test ROM. I have the ROM on a board plugged in the ROM slot to make life easy. If you are certain that the 68008 and the 8301 are good ones you will get a display on a colour monitor.

A green or white screen will give you hours of fun as one, two or all 16 memory chips are faulty. They are all soldered in being absolute pigs to replace. Minerva might help by producing a series of Hex numbers on the screen but it needs another working QL to run the program to indicate the faulty chips.

Problems

The 68008, although quite reliable it does play some funny tricks at times. Stuffing expansions in and out with power on does everything a much harm usually zapping the sensitive 8301 in the process. Gold Cards also work the 8301 particularly hard thus shortening their life.

REPAIRING THE QL - (CONT'D)

A nasty side effect of 68008 failure can be that the QL appears to be OK until an expansion board is inserted when the machine well either crash, not recognise the add-on or generally throw a wobbler. An immediate crash of wonderful psychedelic patterns is obvious as is failure to bring up the title banner of a working add-on. However the nasty one is when the machine appears to be OK but locks up at the most inconvenient time such as just before saving a large vital document.

A totally black screen indicates the CPU may have never started to function. This must not be confused with a faulty 8301 as this will also produce a black screen or a white screen or something between. Wide stripes on the screen either vertically or horizontally means that the CPU has started up and is at least talking to the 8301. The permutations on this theme are virtually endless so if in doubt fit another 68008.

The difference in the colours of the displayed stripes just before the 'tweed' pattern also if they are horizontal, vertical or mixed depends on the internal structure of the memory chips. This varies from one manufacture to another being somewhat academic as what you are looking for is the appearance of the 'tweed' screen followed by the F1/F2 prompt.

Use an oscilloscope to check that the 15Mz crystal alongside the 8301 is oscillating. Some 8301s have IN 4148 diodes soldered from the RGB and sync lines to ground. It does not appear to improve the reliability of this particular chip.

A very few ceramic 8301s were available being instantly recognisable by their brown colour plus a gold plate on top. Part of the oscillator section was omitted from this chip during manufacture therefore an external 15Mz module had to be added using a logic chip glued on the top or at the side. Apparently some special feature in this type of 8301 made it very suitable for the QL emulator running on an ATARI.

I never did pursue this aspect as the total number of ceramic 8301s was certainly less than 50. The initial batch of many hundreds were scrapped to form part of a land fill site behind Heathrow airport simply because they 'did not work'.

Whilst the 'scope is switched on connect it across the three remaining crystals on the board to check they are functioning. The vital one is next to the 8049. The tiny one at the side of the 8302 is solely for the time clock whilst the one next to the MC 1377p is for this PAL encoder chip.

Display

With the just a 68008, 8301 and the ROM in place, the QL should produce the familiar black screen to be followed immediately with the tweed pattern then stick at the F1/F2 prompt. The apparent random tweed pattern is in fact the contents of the ROM therefore it may differ in appearance depending the one being used.

I find it much easier if the ROM is used for testing jumps over the F1/F2 prompt. Minerva perhaps or any other ROM if it has been modified. For test purposes, the code of a jump over ROM can be blown on to an EPROM plus an auto booting test program to provide an auto starting test sequence. This test program could include both a serial port test as well as microdrive tests. By using auto booting technique any need for a keyboard to be fitted whilst carrying out preliminary tests is eliminated.

2nd stage checks

Having arrived at the stage where there is something on the screen it is certain that the 68008, 8301 and ROMs are working. Do not be confused at this stage as a faulty 8301 can give an off-white screen with a wavy edge or more usually a totally black screen. On occasions one of the colours will be off either partially or completely. Bear in mind that the 8301 produces the red, green, blue and sync signals fed directly to an RGB TTL monitor.

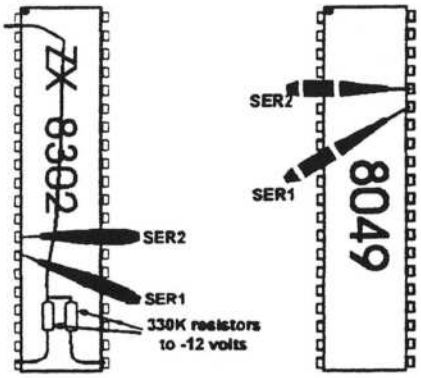
If there is no signal of any kind then all the three guns will be turned off with the screen appearing to be BLACK as is the case with the Microvitec ones. A few monitors give a white appearance in the absence of any input signals. If the 8301 fails with all the signal lines fully on the monitor will appear nearly white. A partially failed 8301 gives an overall colour cast especially in the white areas.

REPAIRING THE QL - (CONT'D)

Lack of horizontal sync is probably due to problems with the MC 1377p chip. Theoretically this should have no effect on the monitor output but in practice it does on some boards. Power down and insert the 8049 co-processor. A quick power up to make sure that a display is still present, then power down again. Pop an 8302 in it's socket and power up again. If you do not use the 'jump over ' ROM then bridge pin 1 of the left membrane socket to pin 1 or 4 of the right hand socket. This is the same as pressing F1 or F2 on the keyboard.

A faulty 8049 gives some good fun and games with a black screen being the first one. Secondly comes no keyboard response, then wrong or missing characters, rubbish through the serial ports etc. Remove the 8049, hurl it into the bin and fit a new Philips or NCR version 0.7. After proving the QL is functional with the original specification chip you can then try with the anti-bounce chip V 1.7 or what you will.

The 8302 has it's part to play in all this especially regarding the microdrives and serial ports. On removing the 8302 you may have noted the very tarnished legs also the two resistors soldered over the top. The tarnish comes from a special type of 'cleaning fluid' applied at the factory at the insistence of one of the Sinclair team. All it did was tarnish the legs whilst the real problem was that the two pull down resistors on the board had incomplete tracks. Get rid of the stuff by gently cleaning the legs making them bright and shiny. Also make sure you have the two 33K resistors soldered to pins 19 and 21 of the 8302 with the other ends joined to the - 12 volt line.

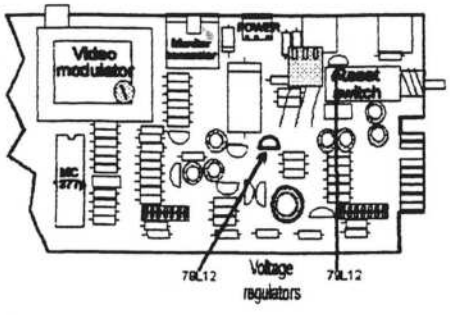


Serial data test points

A stage is arrived at where there is a part functional QL board providing acceptable results on an RGB monitor. No checks have been carried out on the serial ports, microdrives, networking, TV display, mono display or sound at this stage.

Serial ports

The serial ports can be plagued with many problems. These range from not working at all to producing bits of garbage in amongst printed text. A systematic approach will identify the offending item. Resorting to guesswork or chip changing is guaranteed to be a long and painful process ending in failure. I suppose it is possible to get by with a logic probe and intuition but the easiest way I have found to pin point problem is by the use of an oscilloscope.



Step one is to check the voltages into the 2 tiny regulators also the voltage coming out. Use a meter across the little inductor next to the reset switch to check that it has not gone open circuit as it will act like a fuse, going off pop on occasions. Have a look at the co-processor checking that it is marked V 0.7. It could be one of several other types which will probably be the cause of the problem. When you have managed to get the machine working with the standard specification 8049 then you can experiment with other 'improved' versions. If the machine subsequently falls then super chips that have just been inserted cannot be all that super. With the voltages correct, connect the two ports together using a cable then use a small basic program to send data in both directions from one port to the other. See appendix 1 The faults encountered are: Failure to transmit data. Failure to receive data. Missing characters received. Incorrect characters received. Occasional bits of garbage on the output. Check once again that the voltages are correct on the MC 1488 serial driver ic. They must be +/-12 volts. Checking the voltage across the serial port is not adequate as the -12 volts is not available. Grab hold of the 78L12 regulator with your fingers. If it is too hot to hold, change it for one of a larger type. Issue 6 boards have a 0.25 amp NEC 12 volt regulator as standard. Unfortunately this type of regulator is not in any parts list I can find.

TV display

Crammed up behind microdrive one, virtually touching the microdrive ULA is the PAL converter ic MC1377p.

Nothing really special about this RGB to composite colour converter ic with the exception that it needs +12 volt supply. There is provision on the chip for it to produce both PAL as well as NTSC signals by pulling pin 20 high or low.

The board layout in this area is not conducive to a noise free output signal thus both the TV display as well as a composite colour monitor display has the irritating dot crawl. Perhaps some enterprising person will be able to get rid of this unwanted feature eventually as the same chip is used on other computers that produce a far better display. The answer to the dot crawl is to strap 0.01uf capacitors across the three input electrolytics to improve the display slightly. However a more complete solution is to use the tiny video display board from the defunct Amstrad/Sinclair computer as an external unit fed from the R,G B and sync lines.

Only two main failures are associated with the MC 1377p or it's associated components. They are either no display or a super noise free black and white picture. Absence of a TV display indicates a missing +12 volt supply or the chip itself has failed. Look at the background noise level on the TV to see if it increases when the QL is powered up. You may get some indication. The best way is to put a scope on the three input lines, the crystal connection pins and the input to the video modulator. I have heard many tales about having to change the screened modulator block but in 8 years I have only changed one that had been physically crushed.

A nice crisp black and white TV display indicates that the MC 1377p is OK but the crystal is not oscillating or an associated component has failed. There is a series of capacitors, resistors plus an odd inductor all in a row. The snag here is that the resistors look like capacitors whilst the inductor looks very similar. It ain't 'arf confusing until you sort yourself out. The short answer is to cut your losses and change all the bits at once. Saves on labour at the expense of a few cheap parts.

Much rumour has surrounds the difference between the European and American QLs. In reality the difference is in the crystal frequency along with it's related components with a pin of the MC 1377p chip being connected to +12 volts to produce NTSC signals. The ROM also has it's part to play in this but that is a different story.

Mono Display

The R, G, B and sync signals are combined by a single transistor to produce the mono 1 volt 75 ohms impedance signal. Avoiding the MC 1377p video chip gives a nice clean signal without noise and the dreaded dot crawl. I have only seen a couple of QLs on which this transistor has failed. A B C 108 or similar is OK as a replacement.

Network

There is a persistent rumour that many early QLs did not have the hardware for the network fitted. I have checked many hundreds of boards of all Issues from Issue 4 to Issue 7 and in all instances the network hardware is fitted. I cannot imagine why it should not be as it is just a single cheap transistor.

Final checks

Before the main board is put back in it's case it should be run with the microdrives attached including the regulator and heatsink. Make sure you have used some thermal paste between the regulator and the heatsink. Leave it running for at least an hour before fitting it to the case with the keyboard rested in on top. I put a couple of elastic bands round the assembly before a retest as I have found by bitter experience that if the screws are inserted before a final check there is usually a minor problem. Normally this may be a folded membrane tail or an LED connection that has jumped out. If an LED positive connector jumps out then it is very obvious as the LED will not illuminate. If the negative connection jumps out it can contact any part of the board in that area with unpredictable results. It can cause the machine to crash regularly or prevent some part of it functioning and in one extreme example caused the power supply to burn out..

Fitting of microdrives to the board is an absolute nightmare unless you have a Samsung machine. Get yourself some turned pin socket strips and cut them to length. Fit the microdrive tails to the socket strips then fit the assembly to the board in one easy movement.

REPAIRING THE QL - (CONT'D)

Microdrives

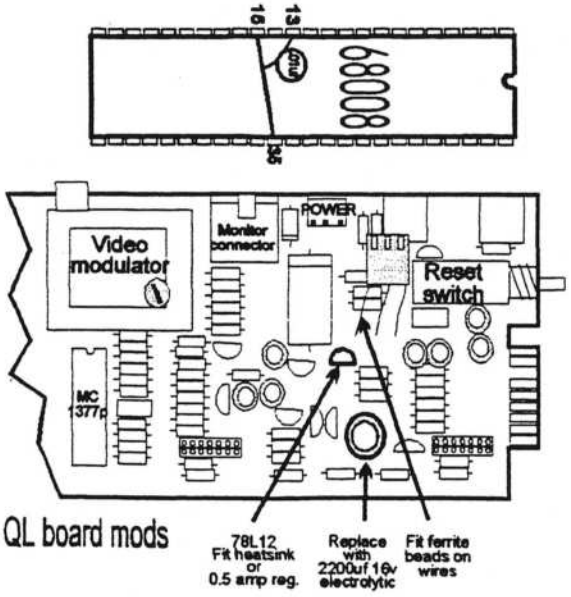
These have been left to last. I do not attempt to repair them as I have a stock of new tested units to last me well into the future. However here are a few notes.Noises from the motor indicate that the bottom bearing is worn out thus the unit has to be replaced. The motor has an electronic speed control accessible from the outside via a small hole underneath. Tweaking this enables you to get more sectors on a cartridge also by going to extremes you can cause the unit not to read any other tapes.

Read/write failures especially on MDV1 are due to the ULA on the head board failing which in turn was due to lack of quality control on early production units. Coloured spot labels indicate factory quality control checks on both the ULA and the tape head.

Later tape heads have the casing connected to ground. This head is fixed in position and cannot be realigned not even by brute force as one QL author found to his cost.

MODIFICATIONS

Tom Bent carried out a great deal of work in making the QL more reliable. Similar mods appeared on other machines particularly the Samsung built units and are worth using.



1. Connect pin 15 to pin 35 on the 68008 then connect pin 13 to this bridge with a 0.01uF capacitor. This is better carried out on the print side of the board as it is then permanent.

2. Replace the LS logic chips with HCT versions.

3. Replace the large electrolytic under the heat sink as it looses performance due to it being run at a high temperature..

4. Replace all the electrolytic capacitors on the board and on the power supply as after 10 ten years operation they are well past their life span.

5. Fit ferrrite beads on the wire running from the 78S05 to the memory supply track next to the left hand membrane connector.

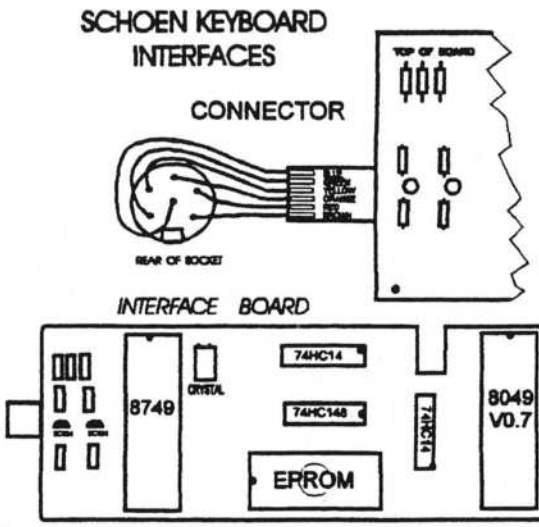
EXTRA INFO

Inserting or removing any peripheral with the QL powered up may cause damage to the QL as well as the interface. Usually one of the buffer chips on the peripheral fails and it may zap out the 8301 in the QL. On the early CST board the EPROM sometimes becomes scrapped and occasionally the WD 1770 becomes faulty. I think that the scrapped EPROMs are a direct result of inserting them the wrong way round. It is vital that careful notes are made of chip orientation before they are withdrawn. Do not rely on the indentation on the sockets as these are often incorrect. This board also had the 34 way connector fitted upside down later only to be corrected on the second version. PCML corrected an upside down disc drive connector with many bits of wire soldered across various points to effect the change. The later board was correct.

MEDIC had, what to them, was the bright idea of using the data cable to carry the power from the supply unit built into the disc drive casing, down to the Medic board. The reason for the separate power supply was based on information from Sinclair in one of the news sheets that the QL power supply was not capable of supplying the current needed for both the QL board and a large add-on board. This in formation was immediately proved to be

incorrect. The resulting MEDIC combined double disc drive and large power supply formed a large heavy lump which may have been tolerable if the polarised connected had not been fitted the wrong way round in several instances. Luckily MEDIC fitted an adequate number of buffer chips to the board with the result that stuffing 9 volts into places only where 5 volts should go only two or three logic chips need replacement. It is quite safe to plug the disc drive ribbon cable into the interface with both the QL and the drive unit powered up. This is because the signals on the disc drive are active low. The only time that this practice is to be avoided is if there is a disc in the drive unit with data on it. If the data cable connector has no locating lug on it and it is plugged in upside down then the read/write heads will be lowered on to the disc and rubbish is written to it at that spot.

Keyboard Products produced three different keyboards to be marketed by Schoen. The first one that sat over the QL has mechanical problems introducing key bounce. The later ones with a pc style keyboard has another special 8049 to match the keyboard being used. No replacements are available. The code in this 8049 is very different to the Sinclair 8049 therefore the chips are not interchangeable.



The difference between the XT style & the AT style keyboards is taken care of by the code in the 8749.
Many interfaces have a ROM fitted whith the CE line cut and tied to 5 volts. When an EPROM is used the CE line is grounded.

The Problems I've Seen

Troy, Michigan, USA - Don Walterman

Dennis has asked me to add some comments about my experiences repairing QL motherboards. I haven't taken detailed notes while making individual repairs so this will just be some general observations. Dennis follows a more structured approach than I do. However, his description of his work area fits mine as well.

I received five defective U.K. QL motherboards as part of the package Dennis offered a few months ago in Quanta (the package was well worth the asking price). I also have repaired some U.S. QLs over the past few years.

I prefer to repair QLs using the Minerva rom. Its built in memory tests are a big help. Any descriptions made of the QL wake up sequence apply strictly to Minerva and will not be completely true of other QL roms. The QL goes thru some specific phases as it wakes up. It helps to understand these phases when troubleshooting difficult problems. The phases as I've seen them are:

no display	initial state or power supply not up to five volts
red and green vertical bars	8301 working, not executing rom yet, not writing to ram
geometric (checkerboard)	with Minerva hex error message and random dots in wrong places - check ram and interconnecting traces
white screen	failed to store data or dead 8301
green screen	failed to retain data as written
tweed pattern	reading and writing to ram successfully (may also have Minerva error message over tweed) blank screen with Minerva logo 8302 wakes up and communicates with 8301 (in bottom right only) can also be defective 74LS257
Roms installed messages	
Copyright on bottom left screen	

The Problems I've Seen - (CONT'D)

Most often the faulty QL wakes up with a memory test failure. I note three items right away. First, the Minerva memory data which must be decoded on a working QL using the ramfail_bas program. Ramfail_bas is a very useful program. You enter the hex data provided by Minerva and it draws the QL ram layout on screen with the suspect chips highlighted. It has been a big help in locating bad ram (and in finding problems I have caused when unsoldering the old chips).

Dennis is right, for some reason these memory chips do not come out easily. Although I have a lot of experience unsoldering chips, I've given up on these ram and clip the leads, remove the chips then clean out the holes. This seems to preserve the traces on board in much better condition. Second, I check for chips that are running warm. Any ram chips that heat up after a few minutes on time are defective. Third I check to see if the data lines are shorted to ground. Use your meter set to ohms and measure between pins 14 and 16 with the QL powered off. The worst QL I repaired started as completely dead (no display). The five volt supply was so low the 68008 would not wake up. This was caused by shorted data lines on the ram chips. After cutting the proper data line, the power supply returned to five volts.

If any ram chips are suspect, replace them. You don't want a marginal chip to ruin all the repair time you have invested. One technique I picked up from the service manual suggested using a jumper wire to short the data lines to ground. This works when you have a memory fault on screen. By shorting one bit at a time you will create a set of thin vertical lines on screen. When the lines you create overlay the bad dots on screen you have found the bad memory chips. I have a large stock of spare memory chips. You can probably find your own cheap supply of ram chips by checking computer shows. I see many computer boards sold for a few dollars that have a large number of socketed 4164 ram chips. Make sure to use sockets when replacing ram. You really don't want to unsolder these again do you? I have very good luck using machine pin sockets. They cost more but they give you good reliable connections.

Other problems I've seen include:

Broken trace between pin 25 on the 8301 and pin 7 on the 8302. This is the cpuclk line. Without the clock the 8302 never started running. This was the blank screen with just the Minerva logo in the bottom right corner problem. This was an issue 4 U.K. board. It had a number of other problems as well. The reset switch was defective. Sinclair only used one side of it so it was simple to just run jumper wires to the good side. This board also had some bad ram. I ended up replacing all of it before I found the broken trace. You really do need lots of patience. This board works just fine now...

Broken trace between 8301 and monitor DIN connector. Problem was no blue on screen.

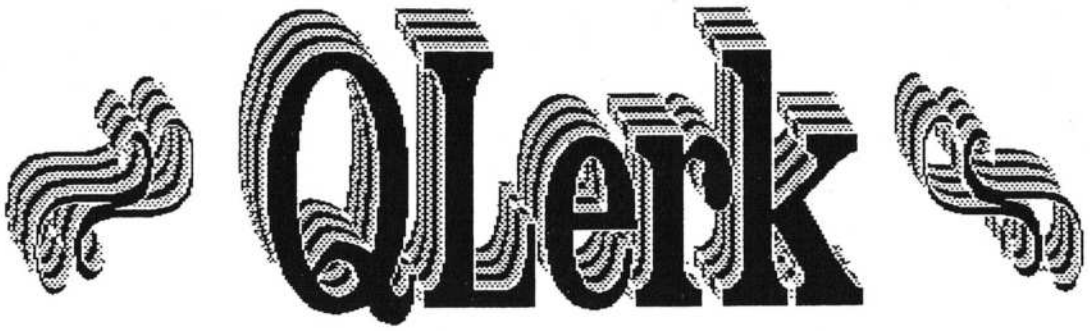
Many, many white screens. Always bad 8301 chips. This problem seems much worse in some QLs that use Gold Cards and have been moved to a case with a switching power supply. New Super Gold Cards come with their own 5 volt connector to prevent this.

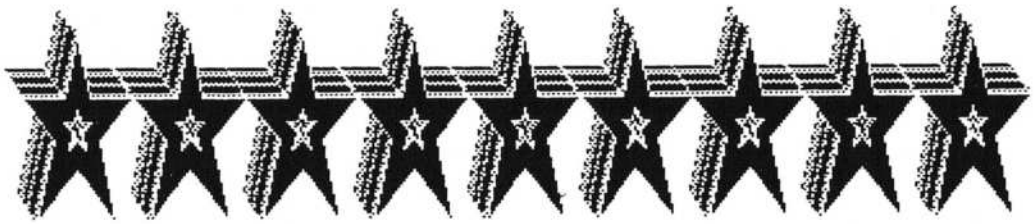
Another class of problems has been 68008 cpus that seem to work in some situations but are really marginal. I have seen defective 68008s that could drive either a memory expansion board or a disk interface but not both at the same time. This would show up as not 'seeing' the toolkit rom on the disk interface at wakeup.

RS232 problems... The only hardware problems I've seen have been some bad 1489 chips. This chip converts the +12 and -12 volts that RS232 uses to the +5 and 0 volts that the QL's internal logic uses. The symptoms of this problem are printing would work but a modem would not. All other RS232 problems I've seen are related to the lousy code in the original 8049. This can be permanently fixed by replaceing the 8049 with Hermes. I view this as a software problem since it is the code the 8049 executes that is very poorly written. The hardware was not defective.

Microdrive problems.There is not much to say here that has not been said many times before. So, one problem I have seen is the microdrive runs whenever the QL is on. This can be caused by the drive transistor failing. This transistor is not on the microdrive assembly but behind it under the heat sink on the QL motherboard.

Hopefully this will help keep your QL running far into the future. I'd welcome any additional information or corrections.





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COMPUTERS 101 (A Tutorial) (Part 3)

London, ENGLAND - Mark Knight

5 Mass Storage.

If the data in a computer's memory is not to be lost when the system is switched off, some more permanent means of storage must be found than the RAM within the system. If the computer is to remain switched on for weeks or months at a time, more data and instructions are likely to be needed than could be contained in RAM, so even mainframes which are rarely switched off throughout their lives need MASS STORAGE.

Mass storage devices allow computers to store programs and data in a form that will last. Most mass storage will keep data even if the power fails completely or the system is shut down.

5.1 Floppy disk drives.

The most common storage method for microcomputers is currently the FLEXIBLE DISK, more commonly known as the FLOPPY DISK. This uses a flat, plastic disk coated in a material closely related to the material used in cassette tapes or videotape systems. Instead of being used to record a sound or image, it is used to record a stream of bits. Recording on a computer disk is known as WRITING to the disk, while playing back the contents into the computers memory is known as READING the disk.

In order to find data stored on a disk, it has to be organised in a pattern when it is saved. Most floppy disks use regularly spaced, narrow circular TRACKS, 80 on each side. Each track is divided into SECTORS, also regularly spaced, and so that the system can find them each sector has a SECTOR HEADER. To give the system time to read and absorb the data from a sector, there is a gap between each sector and the next, known as the SECTOR GAP. All of this information has to be written in blank form on the disk, along with a MAP of where everything is. The process of preparing this information, to make the disk writeable, is called FORMATTING the disk.

The tracks are normally numbered from 0, so a 40-track drive has tracks 0 to 39 on each useable side, whereas an 80-track drive has tracks 0 to 79. There may be eight, nine, eighteen or more sectors in each track, each sector containing a fixed amount of data. Most QL disk systems have until recently used double-sided disks, 80 tracks per side, with 9 sectors per track, giving 9*80*2 = 1440 sectors. As each sector contains 512 bytes, or 0.5k, the disk has 720k of storage space.

With a Gold Card or Super Gold Card fitted you may use HD disk drives (High Density), which pack 18 sectors per track, giving twice the usual 720k, or 1.44Mb. It is also possible to use ED drives (Extra high Density), giving 6400 sectors, or 3.2 Mb. Note that, for some reason only known to disk drive manufacturers, a Megabyte on floppy disk is often 1000k, not the more usual 1024k used when rating RAM storage.

Some older disk drives use only 40 tracks on a side, and some in fact use only one side of the disk. Fortunately these SINGLE-SIDED drives are now rare, as the storage on a disk written in one of these drives is rather limited compared to a modern drive. The technology involved is quite refined, as in order to read a disk, the drive has to be able to position the drive head very accurately on the same track. It is no good trying to read track 1 at a set distance from the edge, and next time at a different distance. Similarly, the sector packing is limited by how fast the system can react as the disk spins.

Early floppy disk drives used EIGHT-INCH DISKS, often single sided and HARD-SECTORED. A hard-sectored disk had one or more holes in it, close to the centre of the disk, and evenly distributed around the circular path. These were read in the drive by a light sensor detecting a small light shining through the holes, and the timing of the sectors on the disk could then be assured to be the same each time the disk was read or written.

Eventually SOFT-SECTORED disks were invented, in which the disk sector headers were written as patterns on the disk when it was first formatted. No holes were required to position the sectors, and the drive became simpler. Disks were also cheaper, as the stage of manufacture where the holes were made was eliminated. The new hardware had to find sectors by reading the sector headers, but the technology had advanced to the point where this was easy enough and cheap enough.

When double sided drives arrived, storage doubled, and it was possible to fit 180k on an 8 inch, single density disk, or 360k on a double density disk. As usual, this was seen as plenty at the time, but later became an almost comically small capacity.

The unwieldy 8 inch disks were eventually replaced by FIVE-AND-A-QUARTER inch disks, though at first not with the same storage capacity as their bigger relatives. The technology of the day could pack 400k onto an 8 inch disk by this time, but 280k was pushing it for a 5.25 inch disk. Later, 360k became the norm for 5.25 inch disks, and the 8-inch drive died from a lack of interest. The newer disks were easier to store and handle, and very soon cheaper, too.

The double-sided, double density 5.25 inch disk arrived eventually, and gave 720k of storage. This was beaten by the newer, HD 5.25 inch disk, giving 1.2Mb of storage, and soon this was being widely adopted. At the same time, the new THREE-AND-A-HALF INCH disks were also becoming popular. 3.5 inch disks, as well as being smaller, were made with a rigid plastic casing instead of the soft, vulnerable jacket of the 5.25 inch disks. 3.5 inch disks were, therefore, soon to become the new standard.

At around the time the QL was launched, single sided, 360k 3.5 inch drives could be purchased in bulk for little more than the cost of the two microdrives built into the QL. This looks like a serious missed opportunity to me!

As data is stored on disks, the sectors are used up. Just as when storing data anywhere else, it must be stored in a fashion that allows the system to find it again. Different operating systems usually use different ways of storing data and programs on disk, but they have much in common, as you might expect.

One common feature is a MAP, known on some systems as a File Allocation Table, or FAT. This is usually stored in track zero, in a fixed location, so that it can be found without having to search the whole disk. It stores a map of which sectors on the disk are free, which are allocated to files or programs, and which are unusable. The MAP is used, in QL systems, along with the DIRECTORY, which is the first file on the disk.

In order that each program or data set stored on the disk can be found when it is needed, it is given a FILENAME. The data is then stored in CLUSTERS, groups of sectors each allocated to a file. This storage does not allow less than one cluster to be used for a file, nor any fractions of clusters. On a QL or IBM format disk, each cluster is three sectors, so the smallest file of just one byte, or even an empty file with zero bytes, takes up three sectors.

This grouping of sectors into clusters simplifies the map and keeps it from taking up too much of the disk. Small files take a disproportionate amount of space, but hopefully there are not too many of these on an average disk, so the waste is not too great in most cases. Each program or datafile on the disk has an entry in the DIRECTORY. The directory contains the filename, length, type, and some other information about the file, including which sector is the first one in the file.

The first sector may then contain the file HEADER, which contains extra information about the file for the filing system to use. There is also frequently a pointer to the next cluster, if the file takes up more than one cluster of sectors. This information may be stored in the MAP or FAT instead, and these details will vary from one filing system to another.

Clusters may be three sectors each, as in QL and IBM PC floppy disk systems, more or fewer sectors, depending upon a number of factors. In some systems the size of a cluster can be changed from one disk to another, and the map may contain details of the sector and cluster sizes. On QL floppy disk systems, these are usually fixed, and are best not changed even when they aren't fixed.

5.2 Microdrives and other tape drives.

Microdrives are a form of TAPE DRIVE. Tape drives are similar to disk systems in some ways, but are much slower to access, and are not usually used for constant, repeated storage in the same way as a disk system. Tape drives common in the computer industry use QUARTER INCH TAPE CARTRIDGES, and are used for backup purposes and for archiving important data. They can often hold 80Mb of data or more.

Microdrives are a smaller, cheaper alternative, and were actually faster than some 5.25 inch drives when the QL was

new, in 1984. The reliability of microdrive cartridges is very poor compared to disks, as they are trying to pack a lot into the tiny area of the tape available to the drives. It is remarkable how good they are, when the problems are considered.

Tape drives, too, divide the tape up into sectors. The first sectors usually contain mapping information that allows the drive system software to select which of the remaining sectors it wishes to read, if the whole tape is not being read. Some tape drive systems use an endless loop of tape, and some use a system like a cassette, where the tape must be rewound after reaching the end. Microdrives use the endless loop system for speed. Although they are divided into sectors, microdrives avoid the cluster system, effectively having a cluster size of one sector.

5.3 Hard disks.

Described simply a HARD DISK drive puzzles some users who have only used floppy disks, as it is rather like a floppy disk drive, but with a disk that is sealed inside and cannot be changed. Why bother with a disk drive that can only ever use one disk?

The answers, of course, are many. The hard disk is sealed in a low-pressure environment, almost a vacuum in many cases. There is no dust, and the read head rides close to the disk on a cushion of air, almost like a hovercraft (I did say almost a vacuum). Unlike a floppy disk, the head never actually touches the disk unless something has gone seriously wrong. The hard disk platter, however, is not like a floppy disk in some important details.

The finish on a the disk inside a hard disk drive is extremely fine, like a mirror finish. Irregularities are polished out in the manufacturing stages, down to the point where only a few microns separates the high and low points on the surface. This allows much, much higher data densities than a floppy disk can manage, and is sealed to prevent dust particles from damaging it.

As well as the disk, the mechanism of a hard disk drive is very special, too. The read head can be positioned much more accurately, and is much smaller, allowing hundreds of tracks on some disks, and many, many more sectors per track than any floppy drive. The disk can be spun at a very high speed, as nothing is actually going to touch the surface, and so access speeds are much higher than floppy disks, too.

In many hard disk drives there are actually two, three, four or more disks, each with heads to read the data from both sides, though normally the software still reads the whole thing as one big disk. On some of the fastest and largest capacity drives, there may even be more than one read/write head to each side of the disk, allowing more than one sector at a time to be read or written, and so allowing very fast transfer of data to or from the disk.

Instead of the 720k or 1,440k of data on an average floppy, a typical modern hard disk drive has 80Mb, or 80,000k of data storage capacity. Some hard disks can also transfer data to a computer memory hundreds of times faster than a floppy disk. The hard disk is like a collection of hundreds of floppy disks, available almost instantly, and without the storage and search problems that arise from keeping so many floppy disks around. (I know about these problems first hand - my QL 3.5 inch disk collection is well over 250 disks - over half of them backups, of course).

Because of the large capacity, it is also true that backup procedures are a good idea if data on a hard disk is important. A backup tape drive is usually the way that business users back up a PC or Macintosh hard disk, and floppy drives are the normal backup on QL systems.

Sector, Cluster, and MAP or FAT sizes may vary enormously on a hard disk, as well as other details of the filing system. SUBDIRECTORIES are essential on such a system, making it possible to impose some orderly structure upon the thousands of files that can be packed onto a typical hard disk.

When asking for a list of the files on a disk (hard or floppy), the DIRECTORY command for that computer is used. Some files may not contain a program or data, but another list of files. It is as if a filing system had folders in it, but some of them contain other folders instead of just paper. Using the directory command on that file will produce a list of the further files that it contains. Some of these could also be subdirectories, too...

A common feature of hard disks is their faster ACCESS TIME compared to floppy disks. The average access time of a storage medium is the average time taken to find the start of a selected data item on the medium. The average

access time of a microdrive cartridge is about three and a half seconds, while that of floppy disks is around a quarter of a second. Hard disks now often have average access times of less than 20 milliseconds.

The DATA TRANSFER RATE (DTR) is also important; this is a measure of how many kilobytes per second can be transferred from the disk to memory or from memory to disk. A QL 720k floppy disk usually has a maximum DTR of about 30k per second, while 1.44Mb disks give approximately 60k per second and the ED, 3.2Mb capacity disks provide around 120k. The slowest QL hard disk transfers data at about 210k per second, and some other QL hard disk systems have been advertised as giving more than 512k per second.

5.4 Optical disks and Magneto-optical disks.

Optical disks use a different method of packing data onto a disk, but are often very similar in what they do to a floppy disk. Larger amounts of data can be placed onto an optical disk, though in some cases a drive can only read disks, never write to them.

The most common type of optical disk drive is the CD-ROM, the COMPACT DISK READ ONLY MEMORY drive. A CD-ROM uses disks exactly like those used in an audio CD player, but instead of storing digitally encoded music, the disk stores digitally encoded data. The laser reads the bits of data from the data track as the disk rotates, and naturally these drives cannot write to the disks, which have the data or programs permanently etched onto them.

One disadvantage of a CD is that it is not a true random access device, as the information on the disk is recorded on one long spiral track, marked out from the edge to the centre. To make things faster, the start of a CD-ROM disk has a map of the information on the whole disk, allowing the software to look up what it wants and then go directly to the appropriate area, but it is still much slower than the separate tracks and sectors of a hard disk.

CD ROM disks have a massive advantage over floppy disks, however, as they can store 550, 600 or 650Mb of data on a disk. To put this in perspective, one CD-ROM disk could contain the entire Encyclopedia Britannica including illustrations, plus the complete works of Shakespeare, a large dictionary (including definitions), and a thesaurus as well, plus software to read all of this. Plans are also afoot in the computer industry to double the capacity of standard CD-ROM disks by changing the lasers and moving the bits closer together on the disk. One recent report suggests that the capacity, far from being merely doubled, could be increased to ten times the current value, to 6,500Mb per disk, or 6.5Gb.

A new form of CD, called CD-RECORDABLE, has been developed recently, and drives are available for both audio and computer users. The recordable CD can have data written on it by the drive, and allows massive databases and archives to be built up. Although both disks and drives are still very expensive, they are popular backup systems in some industries.

Other types of recordable optical disks exist, usually using MAGNETO-OPTICAL DISKS. These are read using a laser with a low power setting, but they can be heated by the laser using the higher power setting, and then using a magnetic write head new information can be written to the disk. Magneto- Optical disk standards exist for 20, 40, 128 and 256Mb standard capacities, as well as the CD-ROM standard capacities, too.

Magneto-Optical disks are also much faster than CD recordable, as they are organised in separate tracks and sectors, rather like a hard disk. Some of these drives are, as a result, almost as fast as a hard disk, and may actually store more data than a hard disk, and they are also popular as hard disk backup store for those who can afford them.

5.5 Making it faster - the disk cache.

As well as a RAM cache to speed up memory access, a modern computer system is often equipped with a DISK CACHE. The fast memory used in a RAM cache creates the illusion that main memory is fast, too. Just as in a RAM cache, a disk cache can create the illusion that a disk is faster.

When a disk cache is used, tracks and sectors are read off the disk by the disk controller and stored in RAM. Normally as a large file is fetched, one cluster is read, the computer works out where to put it, the next cluster is read, and so on. Some disk controllers have the facility to keep reading the next sectors of the file while the system

is processing, storing the data in the disk cache, which is a separate cache from the memory cache if one is present. When the system is ready to fetch the next cluster or sector, it is already in RAM in the cache, and so can be fetched very quickly. This system breaks down if data is not read in the set order, from the start to the finish of the file, but otherwise speeds disk access tremendously. As most files are read in this start to finish manner, it is a useful addition to the hardware of some systems. This type of disk cache, built into the disk controller hardware itself, is called a HARDWARE DISK CACHE.

Another type of disk cache, the SOFTWARE DISK CACHE, works as a part of the system software, keeping the data in ordinary RAM like any other data. If a database program is using a file, it may need to fetch parts of it from the disk repeatedly, to display records on the screen, for example. By keeping the data in the disk cache, software can speed up all but first access to the file.

Most systems use a fixed, preset area of RAM for this kind of disk cache, and the RAM cannot be used for anything else. Generally, the user sets the size of the cache in such systems, depending upon what the computer is being used for. A system reset is usually required after changes to the size of such a cache, so that the system can restart with the new cache size.

5.6 The future - optical storage, solid-state storage and the unpredictable.

Some computer systems actually use a storage system that behaves like a hard disk drive, but uses a form of SRAM chip that does not lose the memory contents when the power is switched off. Such a drive is called a SOLID-STATE store. These are very expensive in large capacities, but also very, very fast, as fast as RAM of course, since that is what they are. Some researchers are concentrating their efforts on trying to make such solid state storage more reliable and cheaper, so that it can be more widely used.

Optical storage methods using optical chips instead of electronic ones are also being researched, and these often use lasers as both the method of reading and writing to the store. Optical and Magneto-Optical disks are also developing, becoming both faster and cheaper as the research continues.

One of the obvious problems with some of these methods of storage being developed is that they are not currently standard methods. One of the major advantages of a hard disk drive at the moment is that you can almost certainly connect it to your computer, regardless of the make of the drive or the computer. Since the bulk of the hard disk industry uses just three methods of interfacing hard disks to computers, an interface from one manufacturer will work with drives from any other manufacturer using the same standard.

A new drive often needs to have huge advantages in order for it to be adopted at all. If enough users buy the new technology at a high price, more manufacturers will make drives, and soon the price drops as both production volumes and price competition have their inevitable effects.

This can mean that an excellent but expensive technology never gets widespread use, as if there are only a few buyers in the early stages, nobody markets the new drive as a standard. A similar thing happens in other industries, as an example the video industry. A number of years ago there were two standards for video cassettes, the VHS system and the Betamax system. Although the Betamax system was technically superior, giving better picture quality as well as other advantages, not many people bought them. Most distributors of cassettes, both pre-recorded and blank, did not bother with Betamax, and soon VHS was the only standard on sale, as it simply wasn't worth a manufacturer's worthwhile to make Betamax equipment or cassettes.

This all makes buying very difficult. Nobody wants to buy a new kind of Magneto-Optical disk drive, and then find six months later that they can't buy any more disks for it. Caution, sticking to standards and waiting to see what other buyers do is often how company buyers proceed. The few who must have the fastest, or biggest capacity, at any price, sometimes benefit the home, hobby or small business computer buyers by pioneering for us.

6 Software, Firmware.

SOFTWARE simply means programs and data, in other words the intangible instructions and information that enable the system to do its work. If it is stored on ROM, and so is immune to change, it is called FIRMWARE.

COMPUTERS 101 - (CONT'D)

6.1 The Operating System.

One of the problems with computer programming in the early days of computers was that the programmer had to know how to do everything. Writing a letter "A" on the QL screen, for example, can take dozens of machine code instructions. The code for "A", 65, is sent to the print a character routine, which looks up in a table the dot pattern required. The routine then needs to work out which memory addresses in the screen memory represent the current cursor position, and transfer the pattern there. The cursor position then needs to be changed to allow the next character to avoid being printed on top of the "A".

This situation was barely acceptable when computers were only used as scientific research tools, but to sell them to customers the situation had to be changed. When commercial computers began, the OPERATING SYSTEM was the secret of their success.

The operating system is a program that contains routines for printing to the screen, the serial ports etc. and to read the keyboard and any other input devices. Any applications running can then update the screen by using the standard routines provided by the operating system. The operating system also starts up and terminates programs properly, as it keeps track of which areas of memory are free, which used, and what is on any hard disks or floppy disks attached to the machine.

Operating systems help programmers to program without knowing the precise details of how the hardware works. Operating systems also allow a program to work on many sets of different hardware, too. If an operating system like Q-DOS is running on a system with 640k of RAM, programs can call the operating system routines to check how much memory there is when the program runs, so the programmer does not have to know in advance. On a system with 2Mb of RAM, Q-DOS can inform the program or programs running, and allow them to take more.

6.2 The BIOS.

Some computers, like the QL, use an operating system in ROM, which cannot be changed without swapping the ROM chips inside the computer. Other systems don't have an operating system in them at all, but have simply a small ROM area that can search disks for an operating system and load it from there.

The small ROM containing code to load an operating system is often called a BIOS, short for Basic Input/Output System. The BIOS usually contains a series of standard disk, screen and input/output routines that the operating system can use to access the hardware of that machine. This enables an operating system to be used on differing hardware, as the system can itself call the BIOS to find out what is and is not available.

6.3 The device driver.

One of the problems with writing an operating system is that often the programmers cannot know what the hardware it is going to run on will be like, or at least not in every case. As an example, most QL owners use floppy disk drives, yet the QL system was shipped originally with only microdrives as mass storage.

In addition, most QL disk systems have firmware on board that provides RAMDISK facilities. A ramdisk is simply an area of RAM memory that acts like a super-fast disk drive, but the contents are lost when the power is turned off. Ramdisks are ideal for programs that need to create temporary stores on disk, as they are fast, and do not slow the program down as much as writing to a floppy disk would.

Also it is possible to add several types of hard disk to the QL, as to most computer systems. These all require the running programs to access hardware through the operating system, yet the system was supplied with no facility to use them. It would not be practical to provide routines to access every type of hard disk that a user might buy, nor for each type of disk system. As well as this, parallel ports could be added, network expansion cards might be added to an IBM-PC, etc.

The operating system itself often doesn't include these routines at all. It can handle memory, the processor, and supervise the running of programs, but device access is left to another kind of software - the DEVICE DRIVER.

A device driver format is designed for each operating system, so that the system can load and call new devices in a standard way. This is true of Q-DOS, which starts off with drivers for the screen, serial ports and microdrives, as well as the console device, which combines a screen and keyboard. When a disk system is added, it supplies a device driver for the disk drives, and this is linked into the Q-DOS list. Q-DOS can then access the "flp" device just as it could the "mdv" one before, and if a hard disk is added then "win" will be added to the system.

On MS-DOS systems, if just one floppy disk is present it is called drive "A", and if two are present the second is called "B". A hard disk device driver will add another drive, called "C", which software will access using the same operating system calls as for "A" and "B". The only distinction will be the device letter. On a QL, different devices have DEVICE NAMES, and if there is more than one a number is used to distinguish them. Floppy disk one is usually, therefore, "flp1_", drive two is "flp2_". To save a SuperBASIC program on microdrive 1 you could use:

SAVE mdv1_MyProgram_BAS

...while saving the same program to a disk only requires a small change:

SAVE flp1_MyProgram_BAS

...and the same Q-DOS routine will select the device driver, then open the file and send it to the device. The device driver chosen will differ, but because they are written in the standard way, the programmer doesn't need to know about the device in use at all. The device driver is a simple idea that makes expanding modern computer systems of all types much easier.

6.4 What it's all for - the application program.

A running program like Quill keeps much of the complexity of the QL system hidden from the user. The programmers wrote the program to read the keyboard using Q-DOS, then react to the keypresses in a set way, calling the commands, adding the codes for the letters pressed to the document etc. In a similar way, any application is deigned so that the USER needs to know nothing about how the PROGRAMMER made it all work.

Computers are made as a kind of general purpose machine, with a flexible instruction set that can be used in an almost infinite variety of ways. The APPLICATION PROGRAM is the end result of all this, and is the reason for the existence of the machine in the first place. Most users buy computers to make life simpler, and want a programmer to be the one who gives them the tools to get a job done.

An accountant may use a spreadsheet, a writer his favorite wordprocessor, a manager might use a customer database, while a secretary might end up using all three. The important thing to remember is that these are users, and they often do not want to know how the machine or its programs work. It often helps if programmers at least try to remember this when they are working, and particularly when they write manuals.

A programmer needs to be able to think using the orderly, precise logic that computers work with. This kind of cold, pure logic is different to the sort of thinking that we use for much of life, where simpler, less exact logic has to be mixed with emotional considerations, and our minds are geared to interactions with imprecise fellow humans. For this reason and others, one person who has the ability to think in this exact and odd logical fashion will make a good programmer, while another person, equally intelligent, is a poor programmer however hard they may study.

DATA PROCESSING is simply using a computer to process data. DATA is a technical word for information, information in a form suitable for storage in a computer system. A single item of information is a DATUM, more than one is some DATA. Data and data processing are what computers are for.

A WORD Of THANKS

Dilwyn and Janet Jones (of DJC) would like to thank everyone for the kindness and sympathy shown following the death of their son Gareth Sion on Sunday the 9th of October, a special thank you to our customers who have been very patient during this difficult time.

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A BRIEF HISTORY of SMSQ

Le Grand Pressigny, FRANCE - Tony Tebby

"Incompatibilities & Improvements, Bugs & Features"

Was It All a Terrible Mistake? I knew right from the start I should not do it, but so many people were asking for SMS to come out from under its covers that, in early 1992, I outlined a strategy (with Miracle Systems and Jochen Merz) to make a "QL compatible" version of SMS available.

The outline was quite simple. A QDOS compatible SMS kernel existed (and had been in regular use since 1990). A complete set of SuperBASIC procedures and functions existed. A complete set of (extended QL style) device drivers for the Atari ST series existed as well as "portable" disk, serial and parallel port drives for other hardware. There was an environment which supported QLiberator compiled programs. All that was required was the core of a SuperBASIC interpreter.

Following the success of the Gold Card, Miracle Systems were looking for a legitimate operating system for their (as yet undefined) forthcoming computer and Jochen Merz needed an operating system to legitimise the QL emulator for the Atari ST series. It was clear that it would be best to provide a version for the Gold Card as well but as Miracle Systems did not want to get involved in selling software, the Gold Card question was left.

I embarked on trying to find out what Sinclair's SuperBASIC interpreter did. It was not difficult defining what it should do, but Jan Jones had built it on the principles of a GIGO (garbage in, garbage out) machine. With limited ROM space, there was no room for real error checking so Jan just tried to make sure that whatever rubbish SuperBASIC was asked to deal with, it carried on and did something. The "something" was not always obvious.

While WE (QJUMP, those wonderful people at QVIEW, Jochen Merz, Albin Hessler etc.) would never deliberately exploit "holes" in SuperBASIC, the same was not necessarily true of other software suppliers or contributors to PD libraries. In addition, even WE had been known to fall through a hole by accident.

Compatibility, therefore, meant not only reproducing SuperBASIC as it was intended, but reproducing as many oddities as would be necessary to execute most QL software. The two "compilers" for SuperBASIC programs provided a starting point. The aim was to provide a BASIC interpreter which would provide:

1. better compatibility with SuperBASIC than either compiler,
2. execution at least half the speed of QLiberator,
3. an environment supporting both QLiberator and Turbo compiled programs.

Clearly, as some software for the QL will not even work on all QDOS ROMs, total compatibility with a particular QDOS ROM can only be provided by copying that ROM code. Even slight re-ordering of the QDOS ROM routines (as in the Thor XVI) can cause considerable incompatibility. At this stage, there was no intention of providing improvements. The "Minerva Experience" had shown the extent to which the slightest improvements could give rise to extensive incompatibilities. So much for intentions!

The Birth of the QXL

They should not have done it either! In principle, the implementation of SMSQ on a 680x0 processor embedded in a PC should have been fairly straightforward. The Gold Card used the IBM PC disk controller, the IDE hard disk interface is not very different from the Hardcard used in the Miracle QL Hard disk and the serial and parallel ports on the PC are much the same as the serial and parallel ports that you find anywhere except on the QL.

If the QXL had been designed as a card which plugged into a standard AT motherboard (no processor or memory) and provided with drivers to drive a standard keyboard interface, a standard multi IO / floppy / IDE card and a standard Super VGA card, it would have been simple.

To have done this, however, Miracle would have had to have supplied the PC hardware (at a cost of about half the QXL card for a single floppy / 110 Megabyte HD configuration this would have seemed, to me, the obvious way to do it).

A BRIEF HISTORY of SMSQ - (CONT'D)

However, it would have meant that the machine would not have been usable as a PC (sigh of relief) and would have ruled out the use of portables and notebooks. In addition, second hand PCs were widely available either free or for less than $30.

As one of the most likely reasons for a second hand PC being available at a very low price was that the hardware was not quite a perfect clone, then there was no possibility of having a version of SMSQ which would access the IO devices directly. Also, if the QXL were to be put into a real "working" PC, it would not only have to co-exist with its host but would have to work through whatever low level software (Stacker, Doublespace, Hypercache, Smartdrive etc.) was used to improve the IO performance of the PC.

As a result, any direct access from the QXL to the PC was ruled out and the QXL was to be hosted by a DOS program. A logical decision, maybe, but, from the point of view of the operating system software, it was a disaster.

Where is the problem? The PC comes complete with device drivers for all of its peripherals all that needs to be done is to pass data from the QXL to the PC device drivers (using BIOS calls) and vice versa.

There are three problems with this.

1. The design of the PC BIOS does not take account of the requirements of multitasking (it is, for example, impossible to write something to disk while you are waiting for input from a serial port).

2. While the accuracy of the reference manuals about the QDOS operating system entry points left a lot to be desired, the (in)accuracy of "reference" manuals for the PC gives a whole new meaning to the word reference.

3. All the reference manuals (so far examined) for the PC were written in the days of the PC and PC/XT. The PC BIOS also dates from this period. The BIOS has been considerably, and incoherently, changed while the manuals have been superficially updated to take account of AT keyboards, hard disk drives larger than 10 MByte and 3.5" and HD floppy disks.

Take, for example, formatting a floppy disk on the PC. On QDOS, it is a single operating system call. On the PC, however, part of the format operation is performed by the application. The format routine for the Gold Card floppy disk driver took a couple of hours to write. As the PC BIOS does most of the work for you, it should be easy to write a format routine on the PC.

There are a variety of DOS and BIOS calls to help you do this: setting the device parameters, formatting and verifying tracks etc. I have three reference manuals which give example format programs.

I look at the first one, and think "this is very strange". There seems to be no way in which you specify the density and there seem to be no checks for whether the tracks have been correctly formatted: it appears to be automatic. So I try it. Fine, it makes all the right noises and tells me that my DD disk has 1440 sectors. I try an HD disk. Fine, it makes all the right noises but tells me that my HD disk has only 1440 sectors. It try without a disk at all. Wonderful, it formats much more quickly and tells me that I have 1440 sectors! - ALL FREE!

I try the second program: this one checks the error return from the "Format track and verify" call: it even allows me to specify the density. I try it with a DD disk. Fine! it tells me that there are 1440 sectors. I try it with an HD disk. Fine! it tells me that there are 2880 sectors. I try it without a disk: the format fails, excellent! I try it with a bad DD disk telling that it is HD. Fine! it tells me that it has 2880 sectors. Suspicious, I try to copy some files to it using DOS. DOS refuses to recognise it. I try the other two disks: neither is readable. Over to QDOS to look at the disks: there are no sectors 1, 2 or 3 on any of the tracks I look at. This would explain why the first program did not bother to check the error return from "Format track and verify": it does not verify!

On to the third program. This is similar to the other two, but uses the old "INT 13h" BIOS calls rather than the more powerful "DOS function 44h" calls (wonderful this DOS terminology). This requires the use of a separate "verify sectors" call. The verify sectors call seems to work: this routine gets an error on every track: it is right, after formatting, none of the tracks are readable on any type of disk.

A BRIEF HISTORY of SMSQ - (CONT'D)

So, I try it myself. After a lot of experimenting with the BIOS calls described in the various manuals, I am able to write either DD or HD tracks and verify them. The only problem is that I write too many sectors to a track: the last sectors overwrite the first sectors on the track. After a week of work, I can select the density and I can nearly format a track.

Thinks! Microsoft can do it, I should be able to as well. Now we start to see the problem: the DV3 floppy disk format routine is less than 512 bytes. Microsoft's FORMAT program is greater than 32 kbytes, almost the size of QDOS, all its device drivers, SuperBASIC and all its procedures and functions. No wonder all the manuals are wrong. It would take about 200 pages just to list the MSDOS FORMAT program, without trying to explain how it works!

Disassembling all of this program could take months. I decide to trace the two paths of interest: 720k and 1440k formats. It turns out that what you need to do is to poke special values into various undocumented locations in low memory. I note all the locations to be poked and set up a format routine. Within this routine I poke all the required locations, format the disk and restore all the locations to their previous values.

Success, I can now format DD and HD floppy disks. The only problem is that, despite my care in restoring all the poked locations, after a format the PC refuses to recognise any disk change until you hit the reset button. Two weeks have passed and I still do not really know how to format a disk using MSDOS.

Do I spend another 2 weeks finding out how to restore the BIOS after a format operation?
Even if I succeed in making it work on my PC, will it work on any other PC?
How can anyone succeed in selling an operating system where it takes two weeks to write a routine using the operating system calls when it would only take two hours to write the same routine accessing the hardware directly?

Now we find the real cost of the QXL in development. Even though the IO performance of the QXL is well below the levels that it would be reasonable to expect, the implementation of the QXL device drivers has cost between 10 and 20 times the cost of equivalent drivers for other 680x0 platforms. As a result, all the time that had been set aside for the development of the SBASIC interpreter has been swallowed up. For the first purchasers of the QXL, things looked grim: poor IO performance, no SBASIC interpreter. Not a very promising debut for SMSQ.

"You Take the High Road and I'll Take the Low Road"

The QXL hardware strategy was not the only problem to be faced. Miracle Systems, for reasons which should be obvious, wanted the QXL to seem as much like the Trump Card and Gold Card as possible, while Jochen Merz wanted an operating system which was not just developed along the same line as the Atari QDOS extended device drivers but one which went much further.

One man's improvement is another man's incompatibility. Now we have the problem of developing (and maintaining) two different variations of SMS: SMSQ, the basic QL-like version and SMSQ/E, the extended version which is likely to diverge ever more and more from SMSQ. Jochen Merz, therefore, decided to supply SMSQ/E for the QXL as well as the Atari and Gold Cards. (Easy for him to decide: it was me that had to do the work!)

More problems. It seems that computer users are not very sensitive about how much they have to pay for their operating system. They are, however, very sensitive about how much other users pay! Gold Card and Atari users do not complain about having to pay for SMSQ/E (we told then it would be necessary back in 1990), but they do object that QXL users get a "free" version of SMSQ with their QXL. QXL users do not seem to mind being asked to pay extra for SMSQ/E (at the moment the differences are fairly small so it is not usually worth "upgrading") but they do object that Gold Card and Atari users are not being asked to pay more.

Even worse, there are some QXL users who seem to think that they are being provided with a specially naff version of SMSQ to oblige them to cough up a few extra pennies for an upgrade!

Then to cap it all, Miracle Systems produce a Super Gold Card which looks like a Gold Card, but turns out to be rather different. We now have implementations of SMSQ on three distinct hardware families, seven different hardware variants, four different display types, with four different 68000 series processors, in three (and sometimes more) languages. So far, there are more possible combinations than there are users.

A BRIEF HISTORY of SMSQ - (CONT'D)

To avoid the necessity of producing a different version of SMSQ/E for each user, SMSQ now uses a module structure which has been borrowed from the Stella (Stella????) operating system. This allows operating system modules to be selected (or ignored) as the system is booted. In principle, a single version of SMSQ could be delivered which would autoselect the right modules for any hardware combination. In practice, each hardware family (Gold Card, QXL and Atari ST/TT) requires its own special loader, so that it is not worth incorporating all the modules in each version.

Just as the number of users starts to take off, so does the number of variations. Jochen Merz ships a copy of SMSQ/E to a Gold Card user: the next day there is a message "SMSQ/E does not work with the XXX keyboard". Not surprising, the XXX keyboard uses a patched version of the JS ROM. The cure? Another keyboard driver module for the Gold and Super Gold Cards and another language module (the keyboard tables). The net result is one new user and four new variations. Counting variations is soon going to be like counting marbles in a cookie jar.

"'Till Death us do Part" In the days of easy divorce for reasons of mutual incompatibility, it is surprising to find so many QL users wedded firmly to the old software packages of the "use it at your own peril" style. When I started the evaluation of SBASIC, Miracle Systems sent me a bundle of diskettes (about 10 Mbytes worth) of the type of software that they thought might provide a test for the compatibility of SBASIC.

I started looking at these disks on the Atari ST with JS and the E level drivers. After resetting the Atari ST for the tenth time without having found any software which even started to work, I gave up and tried using a Gold Card.

After a day or so, I found two programs that could be executed, played with and removed without crashing the system. All the rest either crashed right at the start, could not be made to do anything sensible, or could only be removed by resetting (I began to understand why some users have been asking for a quick reset). I have been told that a lot more of the software would have worked if I had set the memory size to 128 kbytes, but if you are going to reset you machine to 128 kbytes use one program and then reset again, there is no point at all in using SMSQ: you might as well stick with QDOS on your old faithful QL. Seriously, does anyone use this type of software anymore?

The first compatibility tests were very encouraging: all the programs which crashed on a JS QL crashed with SMSQ. It seemed that we had obtained better than 95% compatibility. Moreover, one of the two programs that worked on the QL worked with SMSQ: the figure was up to 98% compatibility.

"New Lamps for Old" One of the best ways of checking the originality of software is to investigate the bugs. If two items of software perform the same functions correctly, one could be a copy of the other, or they could both be written to the same specification. If, however, two items of software exhibit the same bugs, it can be assumed that one is copied from the other.

There are very few "first level" bugs (bugs which prevent the system functioning correctly under "normal" conditions) in QDOS. Because of the GIGO policy and the desire to limit error checking to a minimum to maintain efficiency, there are a much larger number of "second level" bugs (where the system misbehaves when passed incorrect parameters or data structures) and even more "holes" (where calling a system function with deliberately incorrect parameters has a reproducible if bizarre effect).

During testing of SMSQ and SBASIC, a large number of second level bugs were uncovered in the JS ROMs. Many of these showed up also in Minerva, none in SMSQ or SBASIC. From time to time, users have uncovered a number of second level bugs in SMSQ and SBASIC. All of these were entirely new and have no connection with old QL ROM bugs: SMSQ and SBASIC are entirely original!

Streamlining code has the effect of removing, altering or introducing holes. It is not surprising, therefore, to find that many of the holes that are exploited by some common software, have either disappeared or been altered in Minerva (giving rise to complaints of compatibility problems).

One such case is the xx.xxxxx SuperBASIC vector which is the same in all QL ROMs. This vector is intended to be used with data structures set up by the SuperBASIC interpreter. This has three defined paths controlled by the value of one byte (0, 2 or 3). Someone discovered that it could be made to produce a bizarre effect if the passed a value of

1 in the control byte. The resulting code fragment (which takes longer than using a legitimate call) has been incorporated into a utility, which has found its way into a large number of programs for the QL. The streamlined Minerva code no longer had this hole so a large amount of software stopped working on Minerva. The Wizard did not manage to find the real villain in the code, but succeeded in restoring "compatibility" by setting a register to a value which it would not normally have with SuperBASIC. This, in turn, altered another hole and introduced different compatibility problems.

In SBASIC, however, the hole never existed. Once the villain code had been identified (a week's work) it was, therefore, a simple matter of detecting the villain case and emulating the hole directly. It was a waste of time and effort, and it slows down SBASIC, but that's what it's about, isn't it?

The boundary between a bug and a hole is a very fine one and if some software relies on a bug in the QL ROM do I need to reproduce this bug? Unfortunately, the answer is sometimes GRRRRRR YES.

Twice recently, I have received reports of "bugs" that have appeared in the string handling in recent versions. These "bugs" have been introduced into SBASIC to improve compatibility with SuperBASIC (there are still three "bugs" in SuperBASIC string handling which are not emulated in SBASIC). Neither of these users was aware of that the bugs existed in SuperBASIC: SBASIC is now being used where SuperBASIC never went before.

"Whose Fault is it Anyway?"

One rather tetchy letter complained that SBASIC was very fragile by comparison with SuperBASIC: using a well-known piece of commercial software: "SBASIC crashed". This was misdirecting the blame. As the software was invoked correctly by SBASIC and as it never returned to SBASIC, SBASIC could hardly be to blame.

This well-known SuperBASIC extension started off by trying to identify a fragment of the QL ROM, and, when it could not find any QL ROM code (there is none in SMSQ), it jumped to a completely arbitrary location. BANG. The cure: I re-wrote the extension and incorporated it (with improvements) in SBASIC.

In fact, SBASIC is more robust in this respect than SuperBASIC: error trapping is much more thorough (and forceful). If it had happened in a daughter SBASIC: it could simply have been removed with no harmful side effects. (Perhaps I should implement a keyboard "restart" for Job 0.)

Another difference between QDOS and SMSQ which might give the impression that SBASIC is more fragile than SuperBASIC is the default error handling: QDOS carries on but SMSQ stops to allow a debugger to be started. If the job is already being monitored by a debugger, there is no difference. In the normal state, however, allowing a job which has produced illegal instruction or address errors to continue could easily result in widespread damage to the system data structures, possibly resulting in the loss of part or all the data on a hard disk. SMSQ is, therefore, much safer, even if jobs appear to stop more often.

Many programs compiled with the current version of Turbo are wonderful examples of this. At the start of these programs we find some code which sets a location in memory to 0. Several times later on, the value in this location is moved to register A2 and then there is the instruction to move the contents of address 0 (A2) to D4, D2 is compared against the new value in D4 and then there is a conditional branch.

```
MOVE.W      (A2),D4
.............
SUB.W       D2,D4
BLT.S       ........
```

On the QL the MOVE sets D4 to 3 so the operation of the code is dependent on whether D2 is greater or less than 3.

On Atari STs modified for the old QL emulator, the MOVE sets D4 to 24,622. The behaviour of this Turbo code will, therefore, be significantly different on these STs as the operation now depends on whether D2 is greater or less than 24,622.

A BRIEF HISTORY of SMSQ - (CONT'D)

On unmodified STs with a patched version of the JS ROMs, the MOVE will cause a "bus error" which QDOS ignores and so execution will continue without changing the value in D4. D2 is, therefore, compared against an unknown value: this will give yet different, and rather unpredictable, behaviour of Turbo programs.

On unmodified STs with SMSQ, the MOVE is trapped and these Turbo programs just stop. It is possible to set a special "Turbo mode" (PROT_MEM 0) which emulates the QL ROM access by setting D4 to 3 and continuing. The behaviour of Turbo programs on these STs is, therefore, the same as on a QL: SMSQ is more compatible with the QL than QDOS!

"I See no Ships" While SMSQ with SBASIC marks a great improvement in performance and capability over the old QDOS ROMs, this has not been achieved without creating a few problems. The original SMSQ and SBASIC had very few intrinsic bugs, but many incompatibilities. Unfortunately, it is one of the facts of life of computing that making any changes to a existing software borders on vandalism. The neat structure of the original conception begins to crumble and soon each little "fix" risks introducing a host of new problems. Fixing each one of these introduces more. It is a tribute to Jan Jones original SuperBASIC conception that during the early days of "active development" when new features were being added every day, the ratio of changes to bugs introduced was better than 10:1.

SBASIC is a much more complex piece of software which has the disadvantage of being required to emulate all the quirks of someone's first attempt at writing a BASIC interpreter. It, therefore, starts off being not very neat and it is prone to degenerate more quickly. SBASIC's ratio of changes to bugs introduced is closer to 5:1 - small enough to be convergent, but too large for comfort.

Fortunately, the bugs introduced from version 2.11 (experimental SBASIC) through version 2.25 (the first "release" version) to version 2.42 (current at time of writing) have usually been smaller than the ones they replaced.

Although some compatibility problems with some hardware variations remain to be resolved and there are one or two program which still refuse to function with SMSQ, the original aims for compatibility and performance have been well exceeded and SMSQ is now establishing itself as a living replacement for QDOS.

So, is SMSQ/E at last stable? The answer must be no. As more and more people start using SMSQ/E there are more and more requests for improvements (i.e. decreasing compatibility). SMSQ/E has now passed the point of no return: there are more requests for improved capability than for improved compatibility. The current versions of SMSQ/E are at least as reliable as any QL ROM version and are getting as close to 100% compatibility as is possible while providing better performance and more facilities.

SMSQ/E is a commercial product and as such needs to meet users demands. If users require changes, and it is commercially feasible to provide them, they will get them. SMSQ/E cannot, however be developed in all directions at once.

For software development, a 16 MHz 68000 based Mega STE (1 MIP) with 2 Megabytes of memory running under SMSQ/E (my "standard" configuration) is more than a match for a "standard" 50 MIP 32 Mbyte workstation. A TT or a QXL on a good 486 machine is more impressive still. The Gold and Super Gold Cards have the same standards of raw performance, but suffer from limited display capabilities, poor keyboard and IO.

How much more is it reasonable to do with SMSQ which, by its need for compatibility with a 10 year old computer, is locked into a 10 year old design? Is there enough interest in the type of operating system concepts pioneered by QDOS to make it worthwhile producing a completely new system? The future depends on your response.

(Editor's Note: This is the first of what we hope will be a number of articles from Tony Tebby dealing with this IMPORTANT new operating system.)

Please Note: Jochen Merz's advert elsewhere in this issue. He is NOW SHIPPING all three versions of SMSQ/E:

1) ***The Atari Version***
2) ***The Gold and Super Gold Card Version***
3) ***The Enhanced QXL Version***

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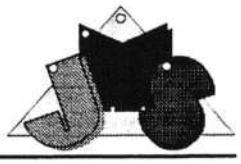

At the time of writing, **SMSQ/E** is shipped for all systems: ATARI, GOLDCard and SuperGOLDCard, and the QXL. The current version is V1.40 - updates are free, just send master disk(s) & return postage.

At various shows I was mainly asked from the QXL users how they would benefit from **SMSQ/E** now. There are a number of advantages: **SMSQ/E** brings more virtual devices (like HISTORY). **SMSQ/E** will give you much better control and buffering for the SER and PAR drivers. You can independently set dynamic oder static buffering to any port, which even allows you to have more than one channel open to the same port (they are printed in the order in which they were opened). And, you can forget about the annoying TRA toggeling for non-English speaking countries. You know how boring it is: you print from Quill, or BASIC - so TRA has to be on for getting the special characters. If you print from text87, LineDesign or you do a ScreenDump, TRA has to be off. That's no real multitasking! With **SMSQ/E**, you can specify on every channel you open whether it should use TRA or not. So, just leave TRA always on so that BASIC uses it for printing, and tell LineDesign to ignore the setting of TRA!

The integrated Extended Environment does not only give you the advantage that it is incorporated in a "lightning fast" screen driver but also allows you to do things you could not do with the standard SMSQ version, e.g. change the display size at will without re-starting the system!

And if you still can't see any advantages for you, then you'll see them in the next development step! And as it will always cost you the same, regardless at which level you enter the **SMSQ/E** development stage, why not get it now and benefit now!?

More news: QSpread has improved, you can now protect and unprotect cells, it allows you to print the formulae of every cell...

BlackKnight is now V1.4. You can pre-define various directories, to save games to, you can specify the amount of memory BlackKnight should leave OR take etc...

SMSQ/E

SMSQ/E is getting more and more features than originally planned. By now you have probably read quite a lot about it, and there are still many things to tell you about it, unfortunately it is not space here. If you need more info about **SMSQ/E**, look at the previous issue of IQLR - there are many details, and, of course, you are welcome to write for a free catalogue with more (current) details about **SMSQ/E**. Or, even better, get yourself a version of **SMSQ/E** for your system(s) - it is not expensive!

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The SHAPE of THINGS to COME

Zapresic, CROATIA - Zeljko Nastasic

Foreword: I'm sure that many readers would be surprised to find that my name actually IS pronounceable - here's a short guide: First please note that I cant actually write it down as it should be written (needs some special characters). Well, anyway - the Z in my name is pronounced like GE in SabotaGE, and the J is pronounced as the Y in Yes. As far as my surname goes, that's easy - English speaking people would write it as Nastasich. As you can see, fairly complicated - in fact, even among Croats it's considered to have 'too many letters' - that's why people call me Nasta.

Miracle Masterpiece Enhanced Graphics Card

Status: You might be using one right now!

Finally, the QL is to get a major revamp of it's graphics capability - rumours of this piece of hardware started a while back, when the Super Goldcard was still in development, and Stuart Honeyball himself finally put a stop to them - by making public the specifications - at the Reggio Emillia 'Garage meeting' in Italy, which I had the pleasure of attending.The card is a small PCB which plugs into the socket of the 8301 ULA chip, replacing it. That way there are no added connectors - the standard monitor output is still used. If you wish to use a VGA/SVGA monitor (highly recommended), an adapter will be made available.

To stay compatible with everything, the graphics card completely emulates the old 8301 ULA, generating both old and well known QL resolutions - 512x256 in 4 colours, and 256x256 in 8 colours with flashing. The news is it is also capable of doubling the resolution in both directions, so we have new, extended modes 4 and 8 - 1024x512 in 4 colours and 512x512 in 8 colours with flashing, but only for SGC users, I'm afraid.There is, of course, a very good reason for this - the extended resolutions have four times as many pixels as the old ones, so they need four times the memory - 128k instead of 32k. Only the SGC has a free memory area large enough to accommodate an additional 128k of dedicated screen memory.

Because the memory speed requirement for generating such resolutions is way beyond the speed of the QL motherboard RAM, the later is disabled. Instead, the card has it's own 128k VRAM chip. The V stands for Video - VRAM is a special kind of memory which enables the CPU and screen refresh circuitry to have access to it simultaneously, with virtually no slowdown - something that a QL user knows about, with the old ULA slowing screen memory accesses to half speed.

The new 128k memory is mapped into the top half of the 256k SGC IO area - the IO area is the reason the card can operate in extended resolutions only with a SGC, because only a SGC has an IO area.

So what's in it for the GC or even TC user? Well, actually, quite a lot! Part of the 128k of VRAM is also mapped into the space previously occupied by the two screen areas of the 8301 - it has to be, for compatibility with the old resolutions, and also to enable programs that access the old screen memory directly to have their output visible in the extended resolutions. Some clever hardware takes care the old screen is shown in the upper left corner when the extended resolutions are used. This also has the added advantage that when a card is fitted into a set-up which does not use a SGC, it will still generate the normal resolutions, but with a nice speed increase - because of the VRAM, writes to screen memory will be twice as fast.

But that is not all. In order to generate the new higher resolutions on old QL monitors the card uses interlacing - a technique where two consecutive pictures with half the vertical resolution are displayed, one containing the even and the other the odd screen lines, slightly displaced vertically, so that the even and odd lines come between each other. This has the disadvantage that the screen refresh rate is halved, so the picture flickers, and because the monitors used on QLs have less physical pixels than the extended resolutions, the picture won't be very nice to look at in general. This is why a VGA or SVGA monitor is highly recommended for viewing the extended resolutions. If you do use one, to stay compatible, the card also knows how to generate the old resolutions on the VGA/SVGA monitor - otherwise you would have to have the old monitor connected, too. Because of that, the card will happily work on a VGA/SVGA monitor even when fitted into a non-SGC system, and at that, it will deliver a significantly higher quality picture compared to a standard QL monitor.

At a 1024 x 512 resolution the extended mode 4 will place quite high demands on a 14" display, especially a colour

display - the users which have the advantage of owning a 17" monitor will certainly appreciate the improved quality of the displayed picture.

For the new resolutions to be usable, new screen drivers must be used. These will come in a new ROM for the SGC - simply replace the old one, and you are set up. Because of the double mapping of the screen memory, which enables programs that write directly into the old screen area to work in the new resolutions, dynamic switching between old and new resolutions is at best difficult to implement, and would also compromise compatibility. Because of this the user will have special commands to choose the resolutions the system will use on power up - standard or enhanced. The choice, however, is maintained in the SGC clock chip, and becomes valid only after a reset.

And now, only the final thing remains - the price. With a price tag of approximately £50, it justifies changing the ageing 8301, whether or not you own a SGC - and if you don't have a SGC yet, you can take upgrading step by step! A highly recommended product, which will bring to the old black box, graphics closer to the standard of the QL emulators.

SuperHermes

Status: Under development

There are rumours about that the well known Hermes upgrade to QL's IPC is to have a successor, the real name of which is not yet known - the above is only an educated guess. With the Hermes chip extending the old IPC functions, it is difficult to imagine how superHermes can have still more functions packed onto an 8049 single chip processor - in fact that's one of the reasons why a 8049 is NOT going to be used.

The new superHermes can therefore be thought of as an 'IPC emulator'. In order to plug into the IPC socket as easily as the 'old' Hermes did, it will be a small board, a bit larger than the socket, and it will use a high speed RISC microcontroller with some additional goodies to implement all it's functions - the original IPC or the old Hermes won't be needed any more. As expected, the new Hermes will happily emulate the original IPC, and Hermes, for that matter - adding 19200 receive, keyboard click, and debugged sound and keyboard input.

You might ask what's new - well, for starters, 19200 receive will now run at full throughput - the old Hermes code is constrained by the speed (or rather the lack of it) of the 8749 chip. Since an additional PCB is used, other things can easily be added - like Caps and Scroll lock LED drivers. And now the real news - it seems there will also be a PC AT keyboard interface, while still retaining compatibility with the QL membrane keyboard, and thus with the QLs joystick ports, such as they are.

All the rest is in the realms of pure speculation - since most modern microcontrollers have a built-in serial interface, there is a possibility that a third serial port will be added - something which will certainly appeal to serial mouse users, as it will finally be possible to use a serial mouse and a printer on the old ports, and a modem on the new, third serial port, without problems. Due to the use of a much faster microcontroller, higher baud rates may also be possible, and a more complete set of handshake lines.

There could also be interesting developments involving sound, one of which is to make sound generation independent from serial and keyboard input - the old IPC and the Hermes would slow down significantly when beeping. As customary, the new Hermes will come with additional utility software on disc, which will enable the user to access all the new features. There will also be an attractive upgrade offer - the old Hermes can be traded in for a discount on the new one.

How much are you willing to pay for all this? Well, if you add up the costs of a Hermes, and a keyboard interface (and maybe even an additional serial port), you will run into quite high numbers, and will probably be surprised that the new Hermes will cost less! The bad news - it won't be available for quite a while. However, rumour has it that work on the prototypes has already started - so there may be some surprises!

Backplane

Status: Prototypes are finished

The SHAPE of THINGS to COME - (CONT'D)

A good passive backplane is very much needed presently, as more and more serious users are realising it is time to move their hardware from the confines of the old plastic box to something less constraining. An obvious and affordable solution is to put the whole lot (QL board, all add-on boards, and all drives) into a PC case - which is commonly and cheaply available. However, this is not for the faint-hearted - the designers of the QLs circuit board never had anything like a PC case in mind. Also, a simple way is needed to fit all the extra boards, and the QL motherboard so that it can use the benefits of a good power supply, and a more spacious enclosure.

In my view the only way to do this is to use a backplane onto which all cards go, and onto which a PC power supply can be plugged directly, without the need for soldering. Because of this (and as much because my QL occupies half of my desk, and continually needs dusting) I have decided to design such a backplane.

Unlike some backplanes on the market, this one is to be made as electrically sound as possible. We all know that due to the size of the whole QL set-up, the length of the signal and power lines provides for excessive noise - so much so that it is becoming increasingly difficult to design and add any kind of circuitry to the QL. Because of this steps have to be taken not to further worsen the situation when the backplane is added, and if possible to even make the noise situation better.

There are well known ways to avoid additional noise problems, and they are to be used on this backplane - note however that they cannot undo the noise that all the rest of the system makes. The board is to have a ground plane and termination resistors - making it best suited for a SGC, which was (and I quote) 'specifically designed to work on a backplane'. Needless to say, it will work flawlessly with other boards as well - otherwise there would not be much sense in it!

Another problem which the backplane is to solve is adding slots to plug in new add-on boards. The big problem was to decide about the number of slots the backplane is to provide. Finally, a decision was made to provide for 3 expansion places, and an additional dedicated place for the motherboard. This should cover the needs of most QL systems and the dimensions of most PC cases - in fact, one of the reasons for the decision is to make the board installable into a workstation type case, for use with the upcoming motherboard replacement.

As said, the backplane will also have a PC type power connector, so that a PC power supply can be simply plugged in. Because of this certain trade-offs are needed - for instance some modifications might be needed when connecting some boards - 9 to 5V regulators will have to be bridged, and 12V regulators on the QL motherboard removed, as the PC power supply provides for all needed voltages, without further regulation. The only real change will be that the lines used to carry 9V power will be used for 5V power instead. I can only promise that using 5V instead of 9V will be as easy as setting a jumper on everything I'm involved in - unfortunately I cannot make other designers do the same.

In my view having jumpers which are extremely simple and cheap is better than trying to find 9V switching power supplies, undoubtedly at horrendous prices.I think I can safely predict that prototypes, and maybe even the production version of the backplane will appear at the international meeting in Eindhoven.

Fast Serial Board

Status: Available early this year as a public domain project.

The author of the hardware is Terry Harman (designer of the Fastnet card), and the author of the software is Phil Borman (most recent project - driver for QUBIDE). The project is still under development, and the recent information I have is that throughput tests are being done with two prototypes. The card has a single serial port which will be able to handle high baud rates. The authors expect it to easily do 57600, or even more. The hardware itself can go up to 153600 baud.

The card uses an industry-standard UART chip (Universal Asynchronous Receiver Transmitter) for serial communication, and two FIFO (First-in First-out) chips for hardware data buffering, one for each direction. The original project uses 512 byte FIFO buffers, but 2k chips can also be used, as they are pin-compatible - so no changes are needed in the circuit.

Two versions of the circuit will be made available - one that plugs into the QL's expansion port, and one that uses the ROM port. Unfortunately, I have no more specific information about the project yet, except that there are plans to distribute the diagrams and software over international areas on QDOS BBSs.

QUBIDE expander

Status: Prototypes are on their way

This simple accessory will enable QUBIDE users to add more drives. From the start QUBIDE was designed to avoid the pitfalls of PC IDE - like being able to connect only two drives using difficult master-slave arrangements, and having to know the drive parameters.

Without the drive expander, QUBIDE still needs to rely on master-slave arrangements, which have recently proved to range from problematic to totally non-functional. The expander is a circuit which makes the QUBIDE interface act as multiple IDE interfaces, allowing the user to connect up to four master-slave drive pairs - that is up to 8 drives. Since a large majority of users won't be using 8 drives, provided that up to four drives are used, they could be connected as masters only, thus neatly avoiding all problems with connecting drives as slaves. In effect, you will only need to plug in a new drive, without any worries about changing jumpers on them, or knowing they are there at all!

By the time this article is published, a new release of QUBIDE firmware will be about, adding some new facilities. Since QDOS is limited to 8 drives on each device, on QUBIDE this translates to a maximum of 8 partitions. The number of drives these occupy depends on the size of the drives and of the partitions. However, the new firmware will allow you to decide which partitions (up to 8 at the same time) are to be used from a much larger set - as much as you can have on all the drives connected to the QUBIDE board! In effect, you can tell the driver which partition on which drive it is to use for any win1 to win8 currently in use - in fact it will allow you to change the assignment at any time. On power up the system will automatically use the first partition on the first drive as win1, and run a boot program from there - the boot program can then re-assign anything it wants, including even win1. This can be used to link in only the most used partitions (and thus save in memory space needed to hold the map of the partition). Other, less used drives or partitions can then be linked in only when needed, a good example being a backup drive.

As in the current firmware, the driver will scan the system for any drives it finds, and adjust automatically, even if drives have been added or removed - the only requirement is that the first drive always be present, on which the first partition is of QDOS type. An additional capability which is now under investigation, is connecting an IDE CD ROM. As it is not a winchester disc, it will not count in the 8 logical drives maximum. However, no concrete specifications are yet available for IDE CD ROM drives, let alone a driver.

The expander itself will look much as a normal IDE cable - the only exceptions being that the end that goes into QUBIDE will have a small PCB which acts as a connector, and the other end will have eight IDE connectors to plug into the drives. With this simplicity, there will also come a low price - but that detail is not known yet.

Miracle QXL Accelerator

Status: Under development, to appear mid 1995 or thereafter

At the QItaly Club AGM in July 1994, Stuart Honeyball of Miracle Systems has announced that they are working on an adapter board which will replace the 68EC040 CPU on the QXL with a 68060 CPU, the newest addition to the 68k range of microprocessors from Motorola.

Details about the construction, the name of the board as well as the intended price were not expounded upon, so are as yet unknown. The release time has been loosely defined as the second half of 1995. It is rumoured that the 68060 is even a bit cheaper than the 68040 at the same clock so the board might turn out to be quite cost effective. Since the slowest 68060 available operates at 50MHz (and by the time of launch faster versions might be available at an acceptable price) it can well be expected to significantly speed up the QXL. Miracle estimate a speed of 3 times the original QXL - which will make the QXL about as fast as greased lightning. The faces of the QXL users present at the time (something like a cat that has just eaten a Canary bird) were ample evidence that they can hardly wait to make their really fast QXLs into really really fast QXXLs.

The SHAPE of THINGS to COME - (CONT'D)

QL REPLACEMENT motherboard

Status: Under development

Here I have to start writing in the first person again - this is my own brainchild. Basically, the new motherboard is nothing fancy - merely a reshuffling of existing components (loosing a few in the process) with some added capability (adding some components in turn).The basic idea behind it is to 'modernise' the existing motherboard to the current state of technology in the QL world - hardly anyone could imagine Goldcards (both varieties), Minervae, Hermeses and Masterpiece graphics cards, to name just a few, to be fitted to the existing motherboard. Once they are, however, many parts of the board become obsolete, if they weren't already made so by the passage of time. The following is the current specification:

What was taken out:

- 68008 and associated socket. If space allows, this might still be included.
- 8301 ULA and the associated 128k of slow RAM. The Miracle Masterpiece takes the place of both. However, if space allows, the 8301 will be supported.

- QL ROM - there is only one socket for a Minerva. Your Old ROM can still be connected, as well as an EPROM - a jumper has to be set in order to tell the decoding logic what to expect. There are plans to support EPROM of 128k so that the EPROM can contain Minerva and JS, selected by a switch. Other possibilities exist, but those will work only on the SGC - for instance having Minerva with add-on software mapped into the IO area of the SGC.

- Microdrives (I doubt anyone will grieve for those in age of ED floppies and hard discs)
- RF modulator and TV output, composite video output. The monochrome output will still be present.
- One joystick connector
- Much of the original motherboard's size and power requirement!

What has been replaced and enhanced:

- The serial port connectors are replaced by pin headers compatible with the PC. Ser1 has been fitted with an additional (input only) connector for fitting a serial mouse, which also has power routed to it for the same purpose. Both the input and the output of Ser1 still remain available at the 'normal' connector, but with the limit that inputs on both connectors should not be used at the same time.

- The remaining joystick port (simulating the arrow key) been isolated from the keyboard so any type of joystick can be used (and even an Atari mouse), and an input for a switch to emulate pressing of the ESC key has been added.The connector has been replaced by a pin strip header, and can also supply power to the joystick.

- The network ports have additional protection circuits
- The speaker driver has been totally changed to avoid direct current over the speaker which could result in it burning out (I'm speaking from experience here).

- The reset logic has been improved by incorporating 'power good' logic, so the system stays reset until the power lines are at the correct voltage, something that can be problematic when the QL is powered from some PC power supplies.

- The ROM port has been replaced by a pin strip header an adapter will be available so that devices that plug into the original ROM slot can still be used. The pin strip header is used because it offers much better contact, and is compatible to the one used on the Fastnet board.

What is to be added:

- additional video circuitry, extending the capability of the Masterpiece card with an analogue colour palette, and probably some new video modes (16 colours instead of 8 + flash, and 256 colours). Although this can be connected to older QL monitors (monochrome and colour supporting analogue colour) a VGA or SVGA monitor is recommended. 256 colours are available only in 256x512 (yes, 256 horizontal and 512 vertical). All colours, 4, 8, 16 or 256, can be chosen from a larger palette of 262144 colours.

- possibility to operate from a 5V power supply instead of the original 9V.

The SHAPE of THINGS to COME - (CONT'D)

What has stayed the same

- the 8302 ULA is still used for serial ports, QL clock and the network. This is taken from the socket in the users QL and simply fitted into a socket on the replacement motherboard. As can be seen the board is optimised for work with Goldcards and a backplane, fitted into a PC case. Fitting holes will be provided for DIJ inclined who wish to fit it into a standard QL case, but the accent won't be on this type of application!

The specification details are not finished yet, as the board relies heavily on Miracles Masterpiece card, and Hermes and Minerva developments.

WarpIO

Status: Still only on paper

I have been toying with the idea for a fast serial and parallel interface card for quite some time. This has in fact gone so far that a solution already exists on paper - there is no doubt in my mind that it will work, as it is very straight forward, but some of the upcoming products, described in this article (like the PD serial card and superHermes), have taken the edge of urgency from this project. However, it won't hurt to toss some general specs around - someone might get interested.

The board is intended to be a 'proper' expansion, so it offers no trough connectors - to use it you will need a backplane, and probably a SGC if you have a GC and use the ROM slot for something else - although there may be developments in the future that could circumvent that particular GC limitation.

The card adds two fast serial ports (up to 921600 bps) and a full (PC standard) parallel port. It uses a dedicated 68008 CPU with 128k of 'private' ram for buffering of all ports. The on-board 68008 communicates with the rest of the QL trough dual port memory - the on-board 68008 and the QL CPU have simultaneous access to it. This solution was chosen because it turned out to be much cheaper than the required number of FIFO chips, so they are emulated in software by the 68008. As an added bonus, the size of the buffers can be increased several times at the same price - RAM chips are much cheaper than FIFO chips.

The serial ports offer many options: The baud rate can be selected for each port and direction, separately. It can be chosen from a fixed standard set of baud rates, extended by a user defined baud rate (anything from less than 1 bps to almost 1 Mbps), and there is also a possibility to use an external serial clock source. In the later case, input lines which are normally used for DCD and DSR act as clock inputs, so that very high speed connections are possible without clocking problems. Of course, there is a buffered clock output that can be tied to the clock inputs on both sides of a fast serial connection. The clock can be programmed from a set of 3 high speed rates, and can also be turned off to prevent excessive RF noise.

The on-board 128k RAM is to be used as two 32k input buffers and two 16k output buffers for the serial ports, and the rest of the RAM is used as an output buffer for the parallel port. As with all hypothetical products, the price of such a board is very difficult to estimate - but a rough guess would be around £120, maybe more - depending on the cost of the driver.

One thing that is much easier to estimate is the size - the card could be crammed on a board a bit smaller than a SGC - and the performance - 115200 bps could easily be sustained from a single port even if it goes onto a floppy - the 32k buffer remains only partially filled. The maximum theoretical limit of a 500+ kb/s data flow when all ports are working at the same time could easily be accommodated by the card - however, the rest of the QL would be hard pressed to produce or store such amounts of data fast enough.

Conclusion

As can be seen, if nothing else then from the number of projects currently going on, there will be much to do and many things to play with in the coming years - extending the life of QDOS/SMS machines into their second decade. And if the projects described here are any indication, I would say that the QL is still alive and very well - in fact, it's getting better!

Town Crier Announcements of Upcoming Events

To have your Show, Workshop or AGM listed by the Town Crier, send all relevant information to IQLR's North American address. Please note deadline dates for submissions listed on page two of this issue.

28 January 1995 ***(SATURDAY)***

QREVIEW QL SHOW

Contact: Bruce Nichols
Tel: 0708 755759

Rush Green Junior School (10am - 5pm)
Romford (London area)
Essex
GREAT BRITAIN

Note: Nearest tube station is DAGENHAM East.

4 March 1995 ***(SUNDAY)***

INTERNATIONAL QL SHOW

(Sponsored by: Sin_QLAir)

St Joris College
Roostenlaan
Eindhoven
NETHERLANDS

26 March 1995 ***(SUNDAY)***

Italian QL Show

Contact: Davide Santachiara
Tel: +39 522 70409

Reggio Emilia
ITALY

(this is a proposed show contact Davide for additional information)

10 June 1995 ***(SATURDAY)***

3rd NORTH AMERICAN QL SHOW

Contact: Bob Dyl
Tel: 1 401 849 3805

Faith Luthern Church
1300 Oak Ridge Turnpike
Oak Ridge, Tennessee
USA

EINDHOVEN MEETING 12 November 1994

Yate, Bristol, GREAT BRITAIN - S. W. Honeyball

This venue is developing into a regular international meeting place for Dutch, Belgians and German QL users living near the Dutch border. There was also representation from Britain, France and Switzerland. It is probably not very precise referring to "QL users" since Ataris running SMSQ/E and PCs enlivened by QXLs were very much in evidence as well as genuine QLs fitted with SUPER GOLD CARDs. Jochen Merz, as always, was there demonstrating his vast library of excellent software. His programs are written to run under the POINTER ENVIRONMENT and are all of a high standard and easy to use. This is the advantage of the PE - once you know how to drive one program you can drive them all since they all have a common interface.

Another source of PE programs is Progs of Belgium. This software house is essentially 2 brothers Joachim and Nathan Van Der Auwera who not only speak very loudly but have written some first class graphics and database programs. Anyone who has grown out of Archive should get their DATAdesign. They were demonstrating their piece de resistance LINEdesign. This is the graphics program used, amongst others, by IQLR and is addictive. You can place some text on the screen, expand it, stretch it, rotate it and after that you can even change the font and your artwork will be redrawn in its distorted state but in a different style. LINEdesign illustrates another merit of the PE and that is that it can cope with any resolution. For instance, if you load a picture in LINEdesign on a standard QL and you load the same picture on a QXL in SVGA (800x600) mode then you will see the same thing except that the quality is much better on the QXL. When you print it out curved shapes have smooth edges rather than the jagged edges of more primitive desk top publishing programs.

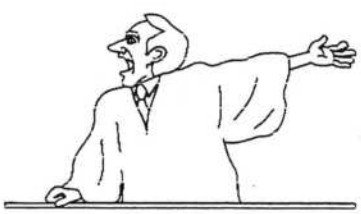
A surprise appearance was put in by the man who made the QL so worthwhile, Tony Tebby. He has an infectious enthusiasm which seems to inspire everyone around. It is sometimes hard to keep up with his quick reasoning but for most of the time it's impossible! Besides writing essential programs like QDOS, TKII, the PE, QPAC2 and many other ancillary programs he has now rewritten the operating system from the bottom up and called it SMSQ. And, on top of that, when another writer failed to come up with the goods, he completed the multitasking successor to Superbasic called SBASIC which comes integrated in SMSQ. If you have not yet progressed to the PE then you should contact Dilwyn Jones or Jochen Merz and get a copy of QPAC2.

I found there was strong demand for SUPER GOLD CARDs and QXLs and was heartened to see plenty in use there. Frank Fritz of Germany showed a colour notebook PC, the NTK Cardstar, fitted with a QXL. This is a remarkably compact system and makes for a truly portable QL.

Eindhoven is an easy place to get to and the venue, St Jorris College, is easy to find being opposite the zoo. There should be more exhibitors at the next meeting which is in March 1995 (see the Town Crier page) and is well worth a visit. Thanks go to the Dutch QL club, SinQLair, for organising a regular meeting in pleasant surroundings.

GENEVA Chatter

Geneva, SWITZERLAND - Ian Pizer



There is nothing like an invitation to write an article to get one to sit in front of the keyboard. So, what will I write about? I wrote in QUANTA about a near disaster with my QL which they published in their October issue - now the French QL Club (QLCF) have made a translation of that article and intend to publish it in their journal "INFORMA". After a critical period I am informed (!) that the club is being re-activated. Good luck to them - with all the hard and soft goodies coming available for QL and its relatives they need not lose faith in their old QL friend.

In the same October QUANTA I complained about a problem - after printing from TEXT87 my mouse refused to budge. I have since realised I only needed to configure T87 to use 1200 baud instead of 2400 and the problem disappeared. I felt an idiot for not realising that! As a long-time member of QUANTA and contributor I can afford to look silly occasionally. I still have a clash between the screen blanking feature of SERMOUSE and TEXT87 (and probably other programs).

If I stop typing for a time longer than the timeout time the cursor usually (not always!) disappears. To get out of this

impasse I need to do the following: CTRL/C, then down arrow to get back into the T87 window, then SPACE. Am I alone with this effect?

Despite using TEXT87 quite frequently it does do funny annoying things at times, like changing the typeface during typing. I can get out of that, when I notice the change, using BLOCK, or shift/F3, or retyping the changed characters. I can transfer text to LINEdesign using PubPack but the instructions on how to configure the PubPack drivers have beaten me, but that has not yet been a major setback.

When I used LINEdesign I soon found that text or drawings went beyond what my EPSON Stylus 800 could print, so I prepared a page which only contains a rectangle representing the very edge of what is printable. I can merge this page to check if anything overruns, and then delete that rectangle (Delete Object) before printing. LINEdesign is a really fabulous program, fun to use and fun to play with. Printing with the EPSON printer gives excellent results, quite professional (360x180, even better at 360x360).

QL meetings do not take place in Switzerland. Once I went to a QL meeting in Italy combined with a very successful holiday at the edge of Lake Garda. One day I will appear at a QL meeting in UK. IQLR and QUANTA keep me in touch with QL news. I do not have much success with BBS. My nearest QL user is Frank Gutteridge who is only 30 minutes away. We natter on the phone and next week he will bring his modem here to see if my modem is faulty. (I cannot download using QUALSOFT software and F5). QTPI is a no-go on my setup - it will dial-up apparently correctly and immediately disconnect. Jonathan Hudson got fed-up with my questions, I don't blame him.

What might I get next? SMSQ/E sounds interesting but I need to know more details so I will wait for the next IQLR. HARD Disk with QUBIDE? But it is such fun inserting and removing ED floppies! Does one need 2 hard disks? (one seems pretty dicey if they crash and you lose all; sure, I can keep the ED disk drives and keep backing up everything automatically with a clever resident program which does it every 24 hours, or once per week).

Anybody using API and SuperBasic with DATAdesign? It gives you great flexibility (somewhat like programming ARCHIVE but its easier with Basic). However the explanations for the special commands are for super-duper programmers and I have had difficulties using them. If enough users were interested somebody could usefully give examples of how to apply the new Basic commands correctly. Here is an example of what I wanted to do - I have a library file with some 300 records with 5 fields. I wanted to transfer them to a PC file, which I succeeded to do, but linefeeds got lost on the way so the result was unsatisfactory. My three EDITORs were not clever enough to insert code 13 (carriage return) in suitable places, so I wrote an API basic program which did the appropriate insertions CHR$(13). I suspect there are even cleverer, simpler, ways of solving that problem.

About IQLR. Your price is reasonable, £25/year for 6 issues of 60 or more pages. Your production and organisation is quite professional. It would help if Credit Cards were acceptable means of payment (is it worth it?). I like the format and the mix of articles and advertisements. With greater use of e-mail it would be nice if QBOX-USA information was available on internet, at least for QLers living outside the USA. I look forward to many years of IQLReports.

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GETTING a BYTE on the PAGE

Hamburg, GERMANY - Roy Wood

When I first got my QL the printer I had was a Brother M1009 - a nine pin dot matrix with both serial and parallel ports but only one font. This served me very well for many years but recent circumstances led me to look for a a better device to produce my documents. These circumstances were not mine alone and introduced a number of conditions which would govern my ultimate choice of printer.

I had long eyed the various printers displayed in the shops but my own use of a printer for personal letters, domestic lists and microphone and sound specifications for the bands that I worked for, did not seem to justify the expense of buying a more high tech machine. I also had this great foreboding about printer drivers - or the lack of them. The little Brother handled all the programs that I had - it printed graphics, screen dumps, and text from all three text programs that I used and I had even struggled through the Quill printer driver to gain umlauts and a pound sign and hated the idea of having to go through that process again.

There are many great mysteries in this world. What was the purpose of Stonehenge ? Why is reverse gear in different places in cars by the same company ? How does the Asprin know where the pain is ? Why do all the aliens in Star Trek speak English ? And why did the ASCII code only go so far and then stop ? With a bit more effort the people who originally invented the system could have included umlauts, accents and all the other bits that most of us need at some point. If the inventors of the code did not do this then the manufacturers of the printers could have got together and come up with a standard (or is this too revolutionary a thought ?). Whatever the reasons for this chaos, we have all spent years finding pound signs turning up as apostrophes and odd symbols that we had never seen before arriving in our texts whenever we strayed from the ASCII domain.

Earlier this year, when our baby daughter arrived, my wife gave up working in the theatre and lost access to the printers there. This meant we had to buy one for her to use at home (she is also a freelance translator from English to German with several plays and operas to her name). This gave me the final push to get a new printer but we needed one that would work on her laptop and on the QL. This was further complicated by the fact that, although I had graduated to Text87 as a word processor, there were still a number of old programs that needed to print things and modern printer drivers for these were thin on the ground.

As usual, I turned to Jochen Merz for advice and he immediately recommended the EPSON Stylus 800. He had many reasons for this choice including the fact that Epson drivers had been consistent over the years and many old programs had an Epson-compatible driver in the printer list and (the clincher!) he used them himself. I accordingly went out and purchased the printer for a modest Dm 500,- (around £200 or $300 depending on tax etc.)

This is not a small unit (45mm x 40mm including the sheet feeder.) but it is light and very efficient. The printer itself gives access to a bewildering amount of text fonts (scalable from 12pt to 32pt), condensed printing and symbolic fonts via the ESC/P2 driver. This, in itself, is an astounding leap in common sense for a printer manufacturer because the same driver is in use on a whole range of printers. I have yet to find a program that will not print with it although QD has to invoke the TRA function to print some of the odder symbols. One thing that I found very satisfying (but not a plus point for Epson) was that, although the QL had no trouble with the printer, my wife could not get the supplied disk with the DOS printer drivers on it to install onto her laptop. It would install into Windows but getting Word Perfect to read the printer driver proved very difficult and necessitated a trip to a DOS expert before it would work. (superior systems - HUH !)

LINE design

ESC/P2 drivers are beginning to appear all over the place. LINEdesign v2.06 sports one and will print a reasonably complex page in a few minutes; although all the Epson drivers worked fine and I found that using the lowest definition 9-pin Epson driver in the PROforma list gave me a feint grey printout which was ideal for a background print on my notepaper. Installation of printer drivers in LINEdesign is simplicity itself and particular printers can be chosen directly from the program at print time so the user can have a few available for specific tasks. All LINEdesign drivers are configurable via the usual Config blocks and the Menuconfig program from Jochen Merz makes this easy.There is one small confusion in the process: when the driver is configured you are allowed to choose the printer port (SER1,SER2, PAR etc.). I did this but when I came to print the dialog box had a blank space for the port selection leaving me to type 'PAR'. After going backwards and forwards from Config to program I telephoned

Progs who said that the driver was configured and would print to the right port - it just did not tell you that in the little box.

One thing that seems to be emerging from Progs is a range of products using the PROforma drivers. I have the acceptionally cheap PFdata to print from their DATAdesign program using all the fonts from LINEdesign, the fonts on the PFdata disk and pictures from LINEdesign. This means you only have to load the PROforma device once and then these programs all use the printer drivers and fonts you have configured. More of this please, Progs.

Text87

Using ESC/P2 printers to the full with Text87 requires the purchase of an extra program and the installation is a whole different ball game. I must say at the start of this that I like Text87 as a word processor and I would not go back to Quill. Using it is both simple and fast and it has many different layers of complexity that you can negotiate when you need them. Configuring the program, however is a nightmare! Although I realise it is not a pointer environment program it is 'designed to exist alongside it' quite happily and I do not understand why, when the latest version was upgraded for subdirectories, the whole configuration process was not given over to those friendly little config blocks or at least something similar. I realise that the ability to change things from inside the program and then look at the result is quite important in a word processor and that flexibility is a great bonus but a lot of us, I am sure, use a standard setup for most of our work and that could be set a lot easier than the program allows. I am not a great believer in pointer driven word processors but there are a few instances where the pointer would be very handy. File and typeface selection are the obvious ones and some of the block and document navigation commands would also benefit.

The 'Typeset 93 ESC/P2' disk written by Ewald Ikemann (available from Jochen Merz @ Dm 69,-) gives you all you need to use the full capacity of the printer from Text87. You have the choice of 255 fonts and styles and all the normal underline / subscript / superscript / bold / italic configurations and, in addition to these, there are some fonts which have the outline or shadow options. The disk contains two printer drivers one (ESC/P2_P87) for all ESC/P2 printers and the other (STYLUS_P87) specifically for the Stylus range giving access to the scalable fonts. It also contains a Fontlist (FOUNT_A87) and a set of extra fonts which should be added to those that are already supplied by Text87 (Some of these fonts are replacements for the originals and give more options). The first task is to replace the original Text87 FOUNT_A87 file with the one on the new disk. This will link some screen fonts (printypes in Text87 terminology) to actual printer fonts. Next you have to increase the video scale from the 72, which is the default, to 80 in order to keep the tab spaces correct on the screen and to make the text more legible. This has the unfortunate effect on the standard QL display of losing the last seven characters off the edge of the screen. If you do not correct the video scale the letters bunch together and the tab spaces sometimes have the unnerving habit of jumping backwards into the middle of the words. Once these two tasks are done you have to tell the program to use the right printer driver - in this case STYLUS_P87.

All of this is done from within the program and the settings are saved using the 'save parameters' and 'save driver' commands. This is all quite logical if a bit 'round the houses' but if you want to attach other printypes to fonts you then have to go to the 'configure fonts' menu and call up the font list. You can then manually delete fonts, or attach them to different printypes. This is quite useful for things such as the 'Symbolic' font which will give borders, lines, fractions and other symbols. The disk gives a printable guide to where these symbols are on the keyboard but beware, this is not WYSIWYG ,- they do not always appear in the same places as they do on the screen. Once you have attached the fonts to the printypes you need to write the fontlist from the command menu and then (and I missed this bit in the manual and spent ages trying to work out why it disappeared every time I exited the program) re-save the DRIVER. As I said before 'why so complex ?'

The Printer

All in all I am very happy with the printer itself. It is quiet, fast and the print quality is very good. You need to be careful in your choice of paper as some paper absorbs a lot more ink when you use the bold option and the print begins to spread but this is the same no matter which ink jet printer you buy. It has two slots for paper feed, the front one will take up to fifty sheets of paper and feed them automatically and the top one will take single sheets or envelopes and override the sheet feeder - putting the printer into 'pause' when it has finished printing so any

GETTING a BYTE on the PAGE - (CONT'D)

overspill from the envelope does not appear on the next sheet. There is the occasional paper jam but that is easily corrected by removing the panel from the rear and pulling out the sheet and it does sometimes get a little greedy and take more than one sheet of paper (also a paper quality problem I think) but on the whole it works well. The cartridges are not refillable but are around half the price of the Hewlett Packard ones.

As I bought my machine in Germany it came with a German handbook but a phone call to the Epson customer services soon produced an English version at no extra charge. Jochen also tells me that there is a sizeable programming manual available from Epson for those of you who need to do these things. I did write to Epson asking them to send me a definition of ESC/P2 in their terms, the price of the programming manual, and any other information that they would like to be included in this article but, as I print this and send it off, no reply has been forthcoming. I suppose that is the difference between a big company and the QL scene. When you ask for information from a QL supplier it takes days not weeks and is usually a lot friendlier.

(Editor's Note: The TYPESET93 ESC/P2 printer drivers are available from Jochen Merz Software. Please note their advert elsewhere in this issue.)

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QReview

£2.00

The reference guide to QDOS and its derivatives

Volume 0 Issue 0

1994

— NEWS —

QReview *(ISSN 1351-1343)* is a magazine devoted to the QL and its derivatives. It is produced entirely on the QL by a dedicated team of QL enthusiasts. The magazine regularly contains articles suitable for the beginner, tinkerer and expert. There are articles on programming in SuperBasic , C68 programming, machine code programming, updates of programs released in the public domain and of course the latest news from around the world. Independent reviews of QL software also feature prominently. A new regular feature is the Help Desk, in each issue readers hardware or software questions/problems are answered in the same issue.

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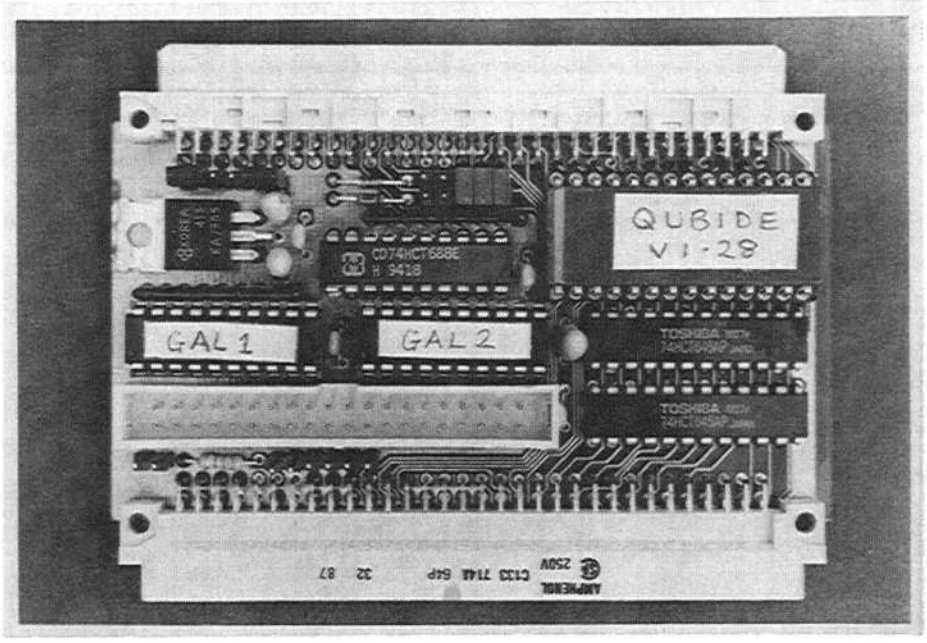
QUBIDE

QL AT/IDE Interface



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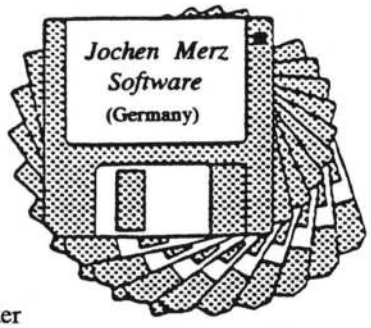
QD and QBASIC Review

London, ENGLAND - Mark Knight



1. QD VI

Introduction.

QD is an unusual editor for the QL for two reasons; firstly because it uses the Pointer Environment, and secondly because it is mainly aimed at programmers rather than those writing text. The Pointer Environment is now becoming more popular, and QD is one of many programs being actively developed in the QL marketplace. Much needs to be done to allow users to make better use of the Pointer Environment, and one thing needed is more software like QD, alive and still supported.

First Impressions.

My first sessions with QD were a struggle, but part of this was because I am so used to another editor, Digital Precision's Editor SE. Moving from a much-used program to a new and unfamiliar one is always awkward, and for some reason changing editors or wordprocessors always seems to be the most awkward of all. In addition, I am not used to working in the Pointer Environment, and I had to adjust myself to this as well.

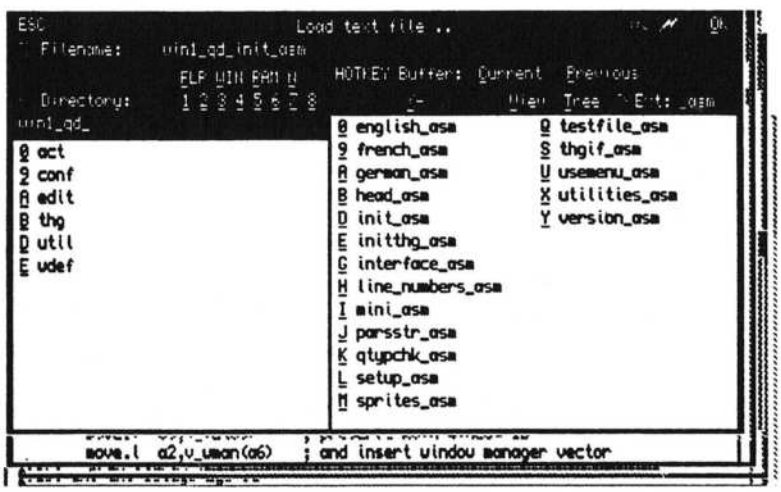
The disk I was shipped contained two sets of files. After copying to a working disk, there were English and German versions of each file, for example QD_ENGLISH and QD, and QD_HELP and QD_HILFE for the help files. The default BOOT file refused to boot into QD, and instead redirected users to the manual for installation instructions. Setting up the package so that the boot file loaded Lightning before the Pointer Environment and QD was easy, and soon I had a working disk to start testing from.

There was a little initial confusion as I mixed up German and English versions of some files, not helped by the fact that the manual was inclined to refer to filenames and make no reference to the fact that there were two versions. This made setting up a bit muddled, but I soon had it all working smoothly, and was able to start testing. I have to say that I don't think the product should be shipped in this state, it should be set up when it arrives, so all I would have needed to do was install Lightning.

QD is not a general purpose text editor, and is not really suited to writing letters, documents or other texts. In the manual, it suggests that QD is mainly for programmers, and is best for writing programs in C, PASCAL, FORTRAN, assembly language or SuperBASIC.

In use.

QD is simple to use, and indeed within half an hour of loading I was using it confidently to edit SuperBASIC and assembly language files of my own. A pop-up file menu on the F2 key quickly leads to a standard file selector system that is used in a number of Pointer Environment programs. This system, known as the menu extension, means that many multitasking Pointer programs can all use the same code for loading files. This makes life easier for users, as once they know one such program, they can use the others without having to learn anything new, at least to access files on disk.



As I don't have a mouse, I really was testing the Pointer system at less than its best, but having said this it was never difficult to use. Moving the pointer when I needed to was slower than with a mouse, but the

cursor keys were good enough. Often, in well written Pointer software, there are keyboard routes anyway, and the pointer is used only as an indicator of where the user is in the menu system. This contrasts strongly with my experience of Microsoft Windows on a PC (none of it voluntary, I assure you) , where use without a mouse is extremely awkward.

All of the usual features are present, block marking, delete, searching forwards and backwards etc. and all are easy to use. It was a pleasant surprise to find a program so easy to learn, and this was strikingly different to my experience with some other Pointer programs, which I have found awkward and alien in their nature. In fact, I was left feeling that this would be a very short review, as there isn't much to say except that it is a very good, Pointer driven programmer's editor, and most users could learn to use it within half an hour of first running.

Special Features.

Fortunately QD rescued me by having a few tricks up its sleeve, such as the excellent SuperBASIC PROCedure and FuNction selector. When editing a SuperBASIC program, QD can pop up a menu of all of the defined FuNctions or PROCedures in that program, and allows you to jump to the definitions instantly while editing. It will also produce a listing of all the assembler labels in an assembly language listing, and will jump straight to a selected label. These two related features were extremely welcome.

QD can also strip off line numbers, and then add new line numbers at a fixed, even interval. Starting at 100 with line interval 10 is the default, the same as RENUM in SuperBASIC with no parameters. RESTOREs and the dreaded GOTO and GOSUB are not affected by this renumbering technique, but RESTORE is easy enough to find and you are asking for trouble if you use GOTO and/or GOSUB anyway!

The only other editor I know that can renumber SuperBASIC programs is Editor SE, and this improves upon QD, since Editor only renumbers the current defined block. With Editor, you can renumber the whole program by defining it all as a block, or parts of it by defining just one section at a time as the block: QD only has the option of renumbering the whole program, and Jochen Merz will probably consider changing this if enough users want it.

Selecting the scroll bars on the right of the screen allowed instant jumps to any part of the program text, though it proved to be a bit of a hit or miss affair trying to make serious use of this, as it isn't easy to judge where the right bit of code is within the text as a whole. The other trick of splitting the window into two (to give two views of the program) was more useful, allowing a programmer to refer to one part of a program while writing another. This could be used to check what parameters are needed by a routine when writing calls to it, for example.

A feature often found in programmers' editors for other machines, but not seen before in a QL editor, is the automatic indenting feature. This indents program lines, so that after typing:

```
IF LineCount% > PageLength% THEN  Split_TEXT
```

...if the cursor is at the end of the "Split_TEXT" line, then pressing ENTER will place the cursor under the "S", not at the beginning of the next line where you would expect a text editor to place it.

Another special feature of QD is the ability to call another program up as part of QD's own menus, if it is written in the appropriate format. This format is one known as the "Thing" format, and the Thing System is in fact familiar to many Pointer Environment users, though in theory Things can be used without the Pointer Environment. I can't help feeling that the Thing System has a daft name; "Resident File System" might have been better, and then instead of being known as Things, the files for this system would be known as "Resident Files".

Daft name or not, the Thing System is neat and extremely useful in the hands of a good programmer. It permits a file to be memory resident, and it can then be called up by name. A Thing can be a program, a subroutine library, a datafile, or some other type of file, and can have data passed to it or pass data to other QL programs or Things. To call the Thing attached to QD, the use only has to press F10, or if your QL doesn't have an add-on keyboard, SHIFT/F5 will do the trick. QBASIC is implemented as a Thing, with special features to make it link smoothly to QD.

QD AND QBASIC REVIEW - (CONT'D)

An Unwelcome Absence.

QD does not have an automatic word-wrap, and so is not suited to writing texts unless you are prepared to press ENTER yourself at the end of each and every line. I found this omission irritating, as with just this feature and a simple paragraph reformat QD would be better suited to producing raw texts. This is clearly not in the mind of the programmer who wrote QD, but it means that many would find QD inadequate, and would need another editor as well.

The amount of code that the word-wrap, along with a simple reformat, would add to QD would be small, and I think the benefits would be great. I hope this will be considered for a future version. The beep that warns users of the right margin was also irritating, but I can't complain as it can be configured off if required. The keypress "click" sound was also irritating when I tried it, but it is off when QD is shipped, and does no harm being available. Try it if you buy QD, you may find it useful yourself.

I found an intermittent bug, too. When the keypress combination intended to jump directly to the bottom of the file was used (ALT/SHIFT/Down) when the bottom of the file was already visible, QD could sometimes lose its cursor. Switching to another multitasking program, and then back to QD, would recover the cursor, though it did need several attempts at times. This never lost me any data, and so is not a serious problem, and I have confidence that once Jochen Merz know of it, it will be removed. *(Editor's Note: the problem has been found and fixed.)*

Documentation.

The documentation supplied with QD is barely adequate, assuming too much about the level of knowledge of users. This is a fault of all Pointer Environment software that I have seen, as it seems to assume that you are already familiar with the system, and so if you are not, you never get a good written introduction whichever Pointer program you buy. This problem is known to Jochen Merz, and will soon be tackled, with possible cooperation from several sources.

The English is quirky in places too, though it is good enough so that there isn't really a language barrier. If all of the information was there, it would be enough, and I feel users would be happy. With all of this said, QD is so easy to use that once up and running, little information is needed.

2. QBASIC

QBASIC is an add-on to QD, designed to allow users to call up Q-Liberator from QD when editing SuperBASIC programs. This is done by installing QBASIC as the QD Thing, and pressing the F10 menu key previously mentioned to call up QBASIC (SHIFT/F5 if using an ordinary QL keyboard, remember). QBASIC does a syntax check on the program, then if all is well it starts up Q-Liberator and compiles it. A final option is to run the compiled program if desired. All this is theory, so how did it work in practice?

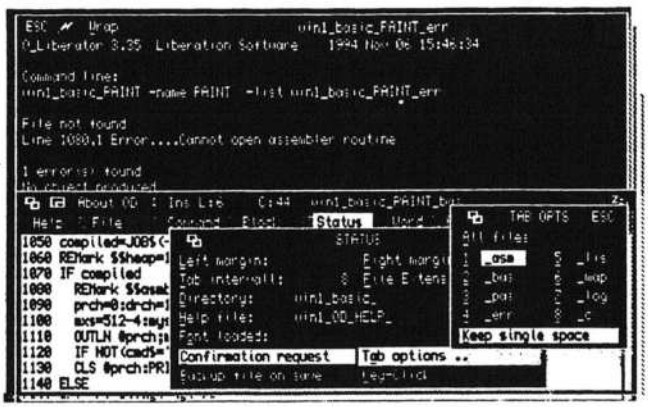
I ran into problems right from the start. Although I normally write about the documentation at the end, I am forced to consider it straight away here, since it is so inadequate that it left me struggling for some time. I am quite an experienced QL programmer, not familiar with the Pointer Environment but nevertheless confident when editing BOOT programs, installing software etc. It still took me over an hour to get the QD/QBASIC combination working, and his was after I had already got QD working smoothly.

QBASIC arrived set up to run from hard disk, which is ridiculous. Very few QL owners, even programmers, have a hard disk, *(Editor's Note: this is changing fast with the launch of the Qubide hard disk interface)* and my system is still a single floppy drive system, though I do have a Gold Card. The manual assumes that users also know precisely what a resident extension is, what the Thing system is, and gives almost no information as a result. It is a total of four pages long, and would be at least five times that if I had written it, and probably longer.

So, as mentioned above I struggled for over an hour, editing the BOOT file for QD, then pressing the reset button and trying it, editing again or reconfiguring QBASIC, reset again etc. Eventually I got QD up and running with

QBASIC appearing in the menu, and Q-Liberator on the same disk. When I loaded a SuperBASIC program into QD, pressed F10 and waited, a neat menu popped up and offered to compile it, compile and run it, or change the Q-Liberator compile options.

I pressed one key and Q-Liberator loaded, compiled the program and another menu popped up. One keypress later and I was looking at my program running, compiled error free by Q-Liberator. I introduced some errors and tried again, and QBASIC caught them, placing the QD cursor spot on almost every time and refusing to waste my time by loading Q-Liberator again.



Within a few minutes, the hour proved to be time well spent. If you are a Q-Liberator user, this would be an ideal way to program. Use QD to write your code, press F10, wait a while as Q-Liberator compiles, then run it with one keypress. Many compilers from the PC and Macintosh world work like this, with an editor integrated into the compiler, and it is a very smooth and efficient way to work. If you make a mistake, finding it within the editor is simple, as most of the time it is found for you when you try to compile.

If Q-Liberator produces errors or warnings, QBASIC will show them before returning you, when you are ready, to QD to edit the program. I experimented for some time, and the more I experimented the more impressed I was. It wasn't any one feature of the system that impressed me, but the sheer simplicity and elegance of the whole combination. For ease of use, I could not fault it, and apart from the trouble getting it running to begin with I could find nothing wrong with QBASIC.

If you wish to be really disciplined about your SuperBASIC, and program or learn to program properly, you can use the option to strip off line numbers and work without them. QBASIC will permit such programs to pass its syntax check, and will allow Q-Liberator to compile them. GOTO and GOSUB and variants will then not be usable, and RESTORE will have to be used on its own. This should make little difference, since even if they are there a good programmer doesn't use line numbers anyway.

If you want to write assembly language programs then QD can call up assemblers too, as an assembler Thing is provided with QD. I was unable to test this, as my assembler doesn't work with it, but the documentation lists more than one assembler that does work. One of these is Q-MAC, the excellent assembler sold by QUANTA. If QD and the Assembler Thing work as smoothly as the QD, QBASIC and Q-Liberator combination they will be superb to use.

Conclusion.

The documentation that I saw is good but with weak points for QD, and terrible for QBASIC. Some users of Q-Liberator use that compiler because they are not experienced or knowledgable programmers, and installing QBASIC as it was supplied to me would be beyond them. Once the documentation is sorted out though, I would heartily recommend QD, QBASIC and Q-Liberator as a combination for writing Pointer Environment software on the QL, or just as an improved way to use Q-Liberator.

The QD/QBASIC combination proved to be really impressive, providing a superb programming environment. The system has no massively impressive individual features, but as a whole it provides a completely new, simple way to work with Q-Liberator. This is a truly modern compiler environment for the QL, the first I have seen, and it was hard to fault. ***In the end, my verdict was: Excellent software, shame about the manuals.***

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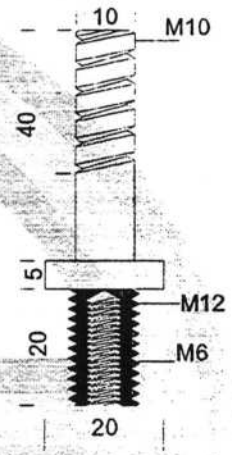

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ORGANISING A QL SHOW

Tal-y-bont, Bangor, Gwynedd, GREAT BRITAIN - Dilwyn Jones

It all started with a bit of leg pulling. I kept asking Bruce Nicholls when he was going to organise a QReview show now that Bob Dyl had organised his second Miracle In Newport. Bruce replied by challenging me to organise a QL show in the North West of England somewhere. Eventually, I gave in and the idea, while looking like a lot of hard work, started to appeal to me. Plenty of people have organised QL shows in England, I thought, so there would be plenty of people to help and advise me.

I started off by writing down the WHAT, WHEN and WHERE for the show. This was in early August 1994.

1. WHAT. It would be a QL show, along the lines of other QL shows such as Quanta workshops.

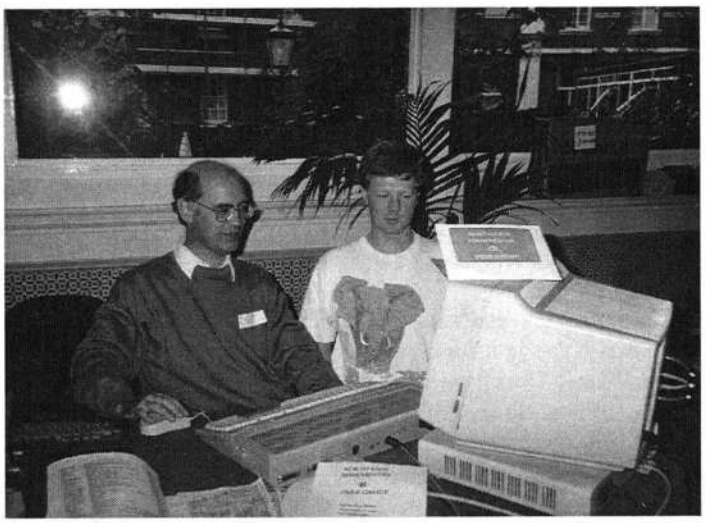
2. WHEN. Luckily (for me), not many QL workshops were scheduled for late 1994, so it was largely a matter of choosing a time to suit me. I ruled out September 1994 (too busy at work), early October (son's birthday first weekend, ironically and tragically he died in his sleep on his birthday), November (possible heavy commitments at work, especially middle of the month, also potential clash with Bristol Workshop, though I didn't know of this at the time), December (too close to Christmas). That left January 1995 or possibly second half of October. I decided to go for January 1995 to avoid a mad rush, as I was afraid that there might be other shows I didn't know about in October (it seemed strange not knowing of any Quanta workshops at all during the last four months of 1994) and my inexperience at organising shows at short notice plus knowing how chaotic life at DJC can be sometimes.

3. WHERE. I live in the north-west of Wales, an area sadly lacking in QL users and without good road connections to other parts of Britain. It had to be held somewhere in the north west of England, I decided, preferably at a location never before having held a QL show. The only places I had a reasonable knowledge of were Chester, Liverpool and Manchester. In the end, I decided that the lovely old city of Chester would be an ideal place as it was a completely new venue and accessible to most parts of northwest England, the midlands and other directions by a good motorway linkup and rail links.

The next step was to do some desk research. I contacted other traders and generally canvassed opinion. Most people said "yes, I'll probably attend", a few were cautious about a new venue, one wanted QL shows to merge with shows for other computers and one said flatly "no chance in the north west, never mind Chester".

Soon it became clear that everyone I spoke to (with the exception of Jcoehn Merz, who had other commitments at the time) wanted me to organise a show in October 1994, not January 1995, so I agreed to change my plans.

I tried to work out likely attendance given the number of traders and visitors at previous QL shows. It seemed ideally suited to a village hall or hotel function room, so I tried to find as many of these as I could by whatever means I could think of - phone book and Yellow Pages business telephone directory, for example.



(Steve Papierowski & Norman Dunbar at the Chester Show)
(left) (right)

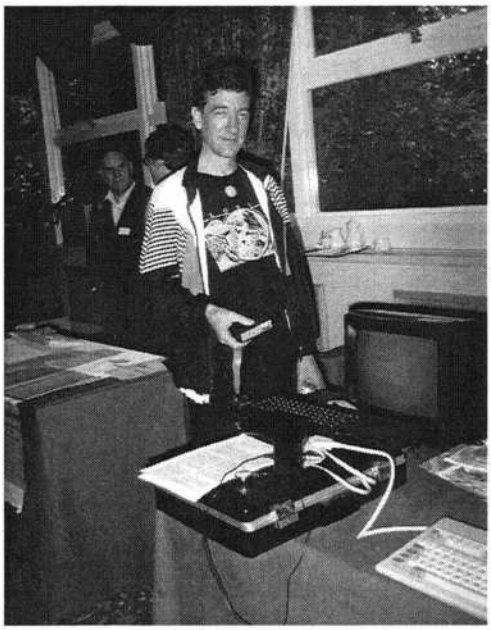
Go situation had arrived. At this point, I was doing all this work alone, but suddenly that changed when the cavalry arrived. A chance conversation between Mike Kenneally of Club QL International and Stuart Honeyball at Miracle Systems (who knew I was looking for a local helper) lead to Mike getting in touch to offer his assistance with organising the show. By now, I was starting to feel in need of help (especially help with local knowledge) and gladly accepted the offer. Mike lived in Cheshire and his knowledge of the area proved quite useful. We spoke a couple of

ORGANISING A QL SHOW - (CONT'D)

times by phone then met up in Chester to look for a venue. Before travelling there, I'd looked up lists of possible venues such as hotels with function rooms, church halls, village halls etc, but one mistake I made was not to ring up various places first to eliminate the unsuitable places and cut down the work on the day. That meant I had to visit as many places as possible on the day and I could have saved myself a lot of work by using the phone first.

The local Tourist Information Office proved to be a valuable source of help and I got lists of possible venues and a list of accommodation from a very helpful official who obviously had good local knowledge.

At this point, I nearly came unstuck. Chester proved to be a city full of hotels with no function rooms and anyway, half of Chester seemed to be away on holiday (moral of the story, don't do your organising in August when everyone's on holiday!). Mike and I ran back and forth between hotels, public halls and all manner of places without much luck. Eventually, we found a place which wasn't on our list, a church on the eastern side of the city in an excellent location with a large car park and ideal choices of rooms in their hall. We were shown around and decided to book the hall. But sadly, we were rather let down in that the booking confirmation never came to being and at the end of the month I hastily had to go back to what had been our second choice of venue, a hotel near the railway station in Chester. I wasn't disappointed - it turned out to be an excellent venue.



(Robin Barker of DI-REN fame)

I asked to book the function room I'd seen a couple of weeks previously, but disaster had struck. Someone else had booked it the day before, and all their other rooms were booked up too. But they could offer another function room at the same price on the Sunday instead of the Saturday. That proved to be a bit of a problem, as some publicity material had gone out and I was faced with a choice of some wrong information appearing in print, or cancelling altogether and going back to the original January 1995 date. I stuck with Sunday 16th October and rang Mike and the other traders who already knew about it to let everyone know about the enforced change of plan.

Two more hints here to anyone else planning to organise a show. Make sure you have a venue before doing anything else. Don't be forced into doing something you feel uncomfortable with. Set your date and stay with it unless you have a real emergency. I had a real emergency for a while - loss of venue!

At long last, though, I had a confirmed venue and a date. Now some hard work of a different kind was about to come along. I contacted the QL magazines to see what deadlines they had and what publicity help they could give me. Magazines, even QL ones, have long lead times and I nearly left it too late for all magazines - I certainly did for IQLR, whose bi-monthly appearance was on the wrong month for me! I hastily drafted a half page sheet to put into Quanta and QReview. I also placed it on the front cover of my catalogue, in the belief that all publicity is good publicity.

Then I sat down and produced an invitation letter and booking forms to send to the QL traders along with a list of hotels and guest houses in the area (list provided by the ever-helpful Tourist Information Office) for those travelling a fair distance to the show. By now it was early September and I was sweating a bit wondering if I was going to manage to finish all this work in time! The work seemed to be coming along in chunks at a time, and each chunk had its own little problems needing to be ironed out. A lot of the problems arose from people being uncontactable and leaving messages which either never got returned or returned too late.

It was decided that public admission to the show would be free to QL users, the cost of organising really being the cost of the venue and a couple of days of my time (so I thought, I should have charged for a hell of a lot of my time, but obviosuly a lot of wasted time goes into a first show, because you'll know exactly what to do the second time, especially if you keep your records for the first). Having divided the costs between the number of traders likely to be

ORGANISING A QL SHOW - (CONT'D)

present, it was decided that as with some other QL shows in the past, this could be financed by dividing the total cost between the traders present, which proved to be about £200 for the two rooms (one for the show, the other for talks and lectures) with the likelihood on past experience of about 6 well known QL traders being present. I made no profit from this - in fact a small loss - and I had to pay up front and recover the money later from the other traders.

I did consider asking Quanta if they would sponsor this event as a Quanta workshop, but by this time I think it had gone too far for that to be a viable option, as letters to the traders had already gone out. The Quanta chairman did suggest afterwards that if I had approached Quanta, the committee would have given it fair consideration, especially as it was a period seemingly devoid of Quanta workshops at the time.

Another idea cropped up at about this time. Being a trader myself I had access to my customer list, so I could mailshot my customers in the area of the show. As a rule of thumb, I decided I would mailshot a radius of up to 2 counties around Cheshire. It proved to be an expensive option, so in the best tradition of our market-forces and private enterprise loving government I started to think of ways to finance this. I approached other traders to see if they would take, say, a quarter page of advertising each in the mailshot, with the cost divided up between those traders taking part. I ended up sending out about 550 letters to customers in all, which kept my wife and I out of mischief for a couple of days between the photocopying, folding, envelopes and licking stamps. I think that apart from the panic at the loss of the original venue, this was the most hated part of all! Obviously, most people organising a show would not go in for this, especially with a Quanta workshop for example.

At the time of booking the hotel rooms for the show, I had also tried to arrange a group discount on hotel rooms. The hotel did offer a discount based on the number of people I thought would wish to stay overnight (mostly traders or Quanta officials, most visitors would be local I thought). However, one problem was that to get a better discount I needed to book a given number of rooms and effectively sub-let them. That could have cost me a great deal of money which I may not have been able to recover, especially if visitors chose to go to stay in nearby cheaper hotels and guest houses. Also, a contractual difficulty became apparent. I could have been held responsible for any damage, theft, etc by guests booked via me, so I settled for a smaller discount with visitors booking for themselves and me simply passing on copies of leaflets issued by the Tourist Information Centre. I was learning to pick up on minor things I'd never thought of before! Another little contractual technicality cropped up here too. Without being aware of it at the time, I was in breach of contract with the hotel by using their name in publicity material for the show without their approval. How people were supposed to find the venue without it appearing in publicity I don't know, but even had I realised this earlier on, there wouldn't have been time to go through the approval process anyhow. Although this was clearly a minor technicality the moral is clear, study the fine print!

(Ron Dunnett's Tower Cased QL on Display)

Suddenly, things started to pick up speed. I started to get phone calls from people asking for more details of the show, or wanting lists of hotels in the area, or wanting a map. Booking forms started to arrive back from traders, though painfully slow and most at the last minute. Trying to get the adverts in for the mailshot proved to be a major headache with many phone calls needed night after night to pull in the latecomers. Some adverts arrived ready to be included as they were, one or two came in handwritten or as files on disk wich I had to prepare prior to printing the mailshot itself. Getting the address list together for the mailshot was a headache. Incomplete addresses without postcodes, finding duplicate entries, people who'd moved house and so on caused me no end of headaches. At last, I had a run of address labels printed, a few hundred pieces of paper and envelopes and a photocopier not too happy with its workload (not that my copier is ever happy with its workload).

ORGANISING A QL SHOW - (CONT'D)

I had known that September was going to be busy at work; little had I guessed just how busy. How I coped with all this I'll never know! Every time I sat down at home to do something, the phone would ring or a software update from an author would arrive... now you know why traders don't often organise shows, we just don't get the time !!!

One final snag which should have occurred to me but being the stupid fool that I am, it didn't. One fairly large mailshot with hundreds of envelopes... one small village post office. Ah. Not enough stamps. Post office lady was not amused that I'd not warned her far in advance, so I had to stagger the mailshot over a few days while I bought enough stamps locally, which given that it was already later than planned nearly caused another disaster!

Amid all this, one aspect I had forgotten about was my stock level which had gone low through general sales and neglecting the stock-keeping while organising the show. I had about 2 weeks left to get the stock to a reasonable level, difficult at the best of times especially when having to order stock from overseas traders.

At this point, the biggest of disasters happened. My son died in his sleep on 2nd of October and I stopped working completely. Members of Club QL International agreed to help with the last minute arrangements and to be at the hotel to co-ordinate things on the day. Small matters which did crop up in those last few days before the show were:

(i) arranging the loan of equipment for the room in which the talks and lectures were to be held. I'd intended to use my spare QL setup, but under the circumstances, I didn't think I'd go and was seriously thinking of cancelling the whole thing had I not been able to get the help of people like John Southern and Mike Kenneally of Club QL International.

(ii) A request from an overseas trader for a monitor, which he was unable to bring for his stand with him on his plane flight.

(iii) Last minute calls from the hotel regarding the number of tables required, position in the room, signs required, number of people expected to use their car park and so on.

On the day... It went remarkably well. Attendance wasn't terribly high, though each and every table laid out was taken up by traders, user groups and other visitors. Most of the English traders came, except for Digital Precision. The only overseas visitors were PROGS. Quanta, Club QL International, Manchester and Liverpool groups formed the user group contingency and one or two second hand bits and pieces stands were evident.

In the end, I attended for a few hours on the day, and most people seemed well satisfied both with the venue and the general organisation, though we could perhaps have done with a few more tables (the hotel had supplied 18, I would say a typical QL show needs about 20-24 tables minimum).

Would I organise another show? I am not sure. For one thing, my personal bereavement so close to this has left me feeling I don't want to do any more work than I have to. On the other hand, the first effort is always a learning time and the second one should go more smoothly with less work. I have learned a lot from this, namely get someone to help me and share the work, plan well ahead, do some 'desk research' first (i.e. look for venues, call others to solicit opinion etc), decide everything before publicising, remember to fill up my Inkjet printer with ink before starting to write letters, have a photocopier repair man standing by, decide how to publicise the event (including for example via magazines, letters to QL sub-groups, personal contact, mailshots, bulletin boards - thanks Mike), decide on a date and stick to it, don't try to organise in August when everyone's on holiday and above all don't let magazine editors talk you into organising shows in the first place if you are a trader with no spare time on your hands!

Yes, I may organise another show next year, but not at such short notice, since so many people (not just QL people) were so slow at getting back to me. It does help if you are a bit of a workaholic since shows need a lot of work to organise properly - you can just go out and book a village hall and stick an advert in a magazine, but it won't work quite as well!!!

PLAN AHEAD !!

The 3rd annual North American QL Show will be held on the 10th of June 1995 in Oak Ridge, Tennessee, USA. Additioal details can be found elsewhere in this and in upcoming issues of IQLR.

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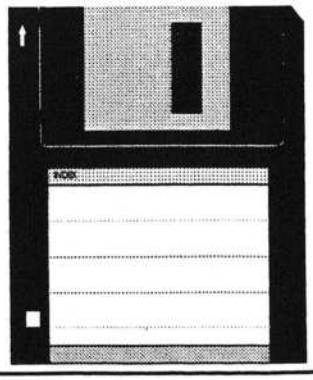

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GETTING The Most Out of SBASIC

Duisburg, GERMANY - Jochen Merz

More and more people are using SBASIC - the wonderful SuperBASIC compatible language which comes with any SMSQ for the GoldCard, SuperGoldCard, all ATARIs and the QXL. It offers far more facilies besides being very fast and able to be executed many times at the same time (we will make use of this feature in some examples later), and a number of those new features can make a programmer's life a lot easier and I will try to explain, how. I assume that most QL users program in BASIC, if they program at all. SuperBASIC is very easy to learn, offers you a lot of flexibility unlike most other languages and does not force you to do things in a specific way. Nowadays, more than 10 years after it has been written, it is still better than a number of other BASICs in many respects, which shows that the author of it had done a wonderful job. However, nobody is perfect, and SuperBASIC was written before many users had a chance to use it. Now, after 10 years, users have told us what they felt was missing. Much of this has been incorporated into SBASIC, making it even more perfect.

String slices.

String slicing has been perfected in SBASIC even more so than in QDOS. You can find out which of the following examples work in QDOS. SBASIC allows you to slice any expression everyhwere. The SMSQ manual gives you an example:

PRINT (date$)(TO 4)

just prints the year. Try this in QDOS. It will fail. First of all, because (TO 4) is not a valid slice for a string, it would have to be (1 TO 4) - but it is still not acceptable for QDOS. You might ask now: why do I have to set the function DATE$ in brackets? Easy: if it is not, how would SBASIC know that you want to slice! The "(TO 4)" could also be a parameter of the function DATE$. Let me show you the difference in a better example: if you want to have random numbers between 0 and .99 - with the accuracy of 2 digits after the dot, then you could use string slicing to reduce the length of the number (which is treated as a string as soon as it comes to slicing) to 3 characters, i.e. the dot plus two digits. How would you do it? Try

REPeat : PRINT RND(1 TO 3)

Run this, and you will see that it is not what you expected. Have a quick look at the explanation of RND. If you pass a range to it, then it will generate integers within that interval, so you get random 1, 2 and 3. We have two choices of getting what we want. The first solution is: turn the function RND into an expression. Easily done, just surround it with brackets. Somebody told you this trick somewhere... :

REPeat : PRINT (RND)(1 TO 3)

Run this, and you'll get what you expect. Another solution, which is possible in the case of RND (and probably in most other cases) is to provide the function with null parameters, so that the next pair of brackets has to contain a range which is used for slicing.

REPeat : PRINT RND()(1 TO 3)

The things above might read funny, but they do work. You can make use of the little trick above also in INPUT. Input may be used to read and output variables. In fact, outputting a variable is possible only if it is converted into an expression. By now you know how easy it is to convert something into an expression: put brackets around it. An example might help here too:

me$='Fred' : INPUT "Hi, I'm ";(me$);". What is your name?"!you$

The value of me$ will be output, but you$ is a variable which you have to fill by entering a name. Of course, there is a shorter (and faster) solution

me$='Fred' : INPUT "Hi, I'm "&me$&". What is your name?"!you$

The three strings are concatenated first to the full text "Hi, I'm Fred. What is your name?" and then printed (resulting in one output call instead of three).

Getting the most out of SBASIC - (CONT'D)

Slicing allows far more. You can read a fixed number of characters into a string, without being forced to press NEWLINE or RETURN afterwards. In QDOS, you either have to do it in a loop or you have to use INPUT and check the length of the string. If we assume that you want to read 4 characters (say, a PIN number of your cheque card etc.) then you could use the following routine:

```
DIM pin$(4):pin$='____':BGET #1,pin$(1 TO 4):PRINT pin$
```

Four instructions, quickly explained: first, a string which can hold four characters is DIMmed. Then, it is initialised. The BGET reads four characters from #1 (usually the keyboard). Then the string is printed (you should not print YOUR PIN-number, by the way! - It is just an example). Why do we have to pre-fill the string? Because SBASIC does not fill the string for us. And BGET does not change the string length. BGET would allow you to read only one or more characters (a substring) of a string without changing the string's length. To give you an idea what THIS means, try the following:

```
DIM x$(4):BGET #1,x$(1 TO 4):PRINT x$
```

Run it, enter 4 characters - nothing is being printed. I can assure you that the four characters went into the string. You can easily confirm this:

```
PRINT x$( TO 4)
```

you see, it has printed your four characters. How does one set the length of a string?

```
x$(0)=4 : PRINT x$
```

It really does work! Try

```
x$(0)=3 : PRINT x$
```

Funny, that! Of course, this works on multi-dimensional string arrays, not only on one-dimensional ones. If you want to change the character in the middle of our three-character string, then

```
BGET #1,x$(2) : PRINT x$
```

Remember character 4 is still stored:

```
PRINT x$(4)
```

You can use this facility to search files easily: a quick example, which is not 100% error-proof, would be:

```
100 INPUT "File to search"!f$
110 fch=FOP_IN(f$)
120 IF fch<0:REPORT fch:REMark Error!!!
130 REPeat
140  INPUT "Search string"!s$
145  l=LEN(s$)
150  IF NOT l:NEXT
160  IF l<=FLEN(#fch):EXIT
170 END REPeat
180 DIM r$(l):r$=FILL$(' ',l)
190 FOR p=0 TO FLEN(#fch)-l-1
200  BGET #fch\p,r$(1 TO l)
210  IF r$ INSTR s$:PRINT "Found at position"!p:EXIT
220 END FOR
230 CLOSE #fch
```

First, a filename is read and the file is opened for reading. Then you are asked for a search string which is checked for not being 0 length (you really should type in a search string) and which should not be longer than the total length

of the file. Another string with the same length is pre-initialised, because it will be used to read through the whole file, byte by byte. We start at position 0 in the file, and carry on until we reach the end. Attention, as we read a variable number of bytes (l, which is the length of the search string), we have to subtract this from the total file length, otherwise the BGET would not get enough characters at the end of the file. BGET sets the file pointer (which will go through the file byte by byte) and read a number of character from there on, which is equal to the length of the search string. Then we compare the read string with the search string. This could also be done with a comparison like = or ==. If you want a 100% match (e.g. upper- and lowercase are distinguished), then you should use = only or add a line

10 INSTR_CASE 1

to the program. Save this file to RAM-disk, say RAM1_search_bas - we need it later!

A difference of SBASIC compared to QDOS's SuperBASIC is, that it initialises every variable. Strings are initialised to zero length strings, numerical variables are set to 0. QDOS does not behave consistent here, e.g.

PRINT zz$;".."

will print an asterisk '*' as zz$ is not defined, followed by two dots. What do you expect from

PRINT zz$&'..'

You would say: I know, this speeds up printing because it concatenates first. Wrong, you get an error. We call this inconsistent. You cannot really expect what happens. Printing an asterisk is nothing you would expect, unless you know it. It is not helpful anyway. When SBASIC was defined, it was sure that it should behave predictable in every case: it should either work all the time, or ALWAYS report errors if you access undefined variables. There are advantages in both cases: getting error reports may help you debugging your program, as it always stops when it encounters an undefined variable. It might give wrong results if you carry on calculating with an undefined value. On the other hand (and in the "spirit" of SuperBASIC, we think) BASIC does not force you to anything, it gives you more flexibility than most other languages. And it can be quite useful, as one of the following examples demonstrates.

A number of people have asked me at QL meetings: "how can I execute an SBASIC program via HOTKEY?". The solution is quite easy, but, you probably have to be told once how to do it. There are 1000 ways of executing SBASIC, but you need only a few in daily use. But, there are good reasons for the other options being there. The SMSQ manual tells you, that there is not only the command "SBASIC" which gives you another running copy of SBASIC, it also tell you that there is the "SBASIC" Thing. Please do not start worrying abouth things, you may consider them as a sort of "RAM Disk". The Things in the thing list are named, as are the files in the RAM disk. Things can be "used", files can be "opened". Both can be deleted etc. So, there is nothing mystic about Things, and in most cases there are easier way to access them provided by other utilities. The procedure SBASIC which will execute a new copy of SBASIC is a shortcut of

EXEP "SBASIC"

which executes the Thing "SBASIC", resulting in a new copy of SBASIC. We can, of course, "tell" the SBASIC Thing to do something, e.g. automatically RUN our little search program:

EXEP "SBASIC";"LRUN ram1_search_bas"

You will see, it works! Magic!

If you remember the various HOT_ instructions which allow you to create all sorts of HOTKEY action, then probably HOT_THING is something we might use.

ERT HOT_THING('b','SBASIC')

will create a HOTKEY which will execute a new copy of SBASIC every time you press ALT b. You probably guessed the next step: why shouldn't we add a parameter string to the HOTKEY definition?

Getting the most out of SBASIC - (CONT'D)

```
ERT HOT_THING('s','SBASIC';"LRUN ram1_search_bas")
```

will start SBASIC and instructs it to LRUN the search program every time you press ALT s. If we go back to having pre-set undefined variables, then here is a nice little program:

```
10 OPEN#0,con
20 WINDOW#0,100,42,x,y
30 BORDER#0,1,4
40 CLS#0
50 PRINT#0,"Position"\x\y
```

All it will do is: open its first window and print the coordinates. Save it as RAM1_test_bas. You know, you can EXecute it:

```
EX ram1_test_bas
```

As x and y are not set, the window will appear at 0,0. You already know by now how to do it using EXEP! You don't? Okay, I'll show you one more time:

```
EXEP "SBASIC";"LRUN ram1_test_bas"
```

Okay, and now let's pass some parameters to it, e.g. define the variables x and y. Of course, we cannot use LRUN anymore as this CLEARs all variables, and this would reset x and y! But, there's MRUN, which MERGEs and RUNs, so here we go:

```
EXEP "SBASIC";"x=50:y=80:MRUN ram1_test_bas"
```

and, the window will appear at 50,80. By now you know how to do this with HOTKEYs, it is easy to adopt the example above.

So, that's it for now, I don't want to fill up the magazine completely. I hope you enjoyed reading this, and of course, you should try this on your machine running SMSQ. If it runs QDOS only, you'll find that most examples will not work. When I started this "little" tips and tricks, more and more came to mind and there is still a lot more to come...

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Does this mean I'm abandoning the QL ??? No way, Jose ! Just making room for more goodies. Mel LaVerne
103 Endicott Lane, Oak Ridge, TN 37830 USA or 615 - 483 - 4153

Notes - QL, Serial Ports & Modems

Shelby Township, Michigan, USA -John J. Impellizzeri

This little article is about some things I've learned and observed while using my QL and its serial ports. This info may be common knowledge, especially to seasoned QL communications veterans but for the benefit of others, here it is. First of all, Hermes is highly recommended for anyone using a QL and its serial ports. It allows the ports to reliably send and receive from 300 bps (bits-per-second) to 19200 bps. Hermes is a replacement for the QL's second microprocessor, the 8049. Sending data out of the ports is not a problem for the QL at any speed. However, trying to receive data at the faster rates, certainly anything above 2400 always seemed to be a problem. With Hermes, the QL will reliably receive at rates up to 19,200 bps, but the modem must be able to respond to a signal from the QL to temporarily stop sending. This is known as a handshake. Most modems will also send a signal using another handshake line to tell the computer to temporarily stop if the modem can't keep up with the incoming data. The QL has two handshake lines on each serial port, one that it uses to signal the modem to stop, and one which it monitors for the modem to tell it to stop. Note that these lines must be connected properly between the QL and modem in order for the handshaking to work!

The US Robotics Sportster 14,400 modem is highly recommended for use with the QL. Not many high speed modems seem to support hardware handshaking from the computer to the modem which the QL absolutely must have to work properly at 9600 bps and above. In other words, the modem must respond to a signal from the computer to temporarily stop sending data until the computer catches up. I tried a number of 14,400 bps modems that wouldn't work with the QL because they didn't support the handshake. The USR does and works great with the QL. The price on most 14,400 bps modems seems to be dropping now that the next generation (28,800 bps) modems are available. I've seen a few for under US $100, but beware that not all of them support full handshaking. If you've found a high speed modem that works good with the QL, why not let IQLR know so that others searching for a modem will know what to look for.

Enabling the handshaking in both direction varies according to the modem. Most seem to come with the handshake turned on in one direction only, where the modem can tell the computer to stop (transmit data handshake). Turning on the receive data handshake is very important for the QL. For the US Robotics modem this command is 'AT&R2'. By the way, the USR command for transmit handshake is 'AT&H1' which it comes from the factory set for. These commands vary from modem to modem, even though they all seem to claim that they use standard Hayes commands. It appears that only the basic Hayes commands are standardised, the others tend to vary among manufacturers.

I found an excellent book about data communications which covers the basics of serial communications including data, fax and modems. It also includes a very complete section on AT commands and the differences between them on various modems. The book is called 'Programmer's Technical Reference: Data and Fax Communications' by Robert L. Hummel. It is published by Ziff-Davis Press. ISBN 1-56276-077-7.

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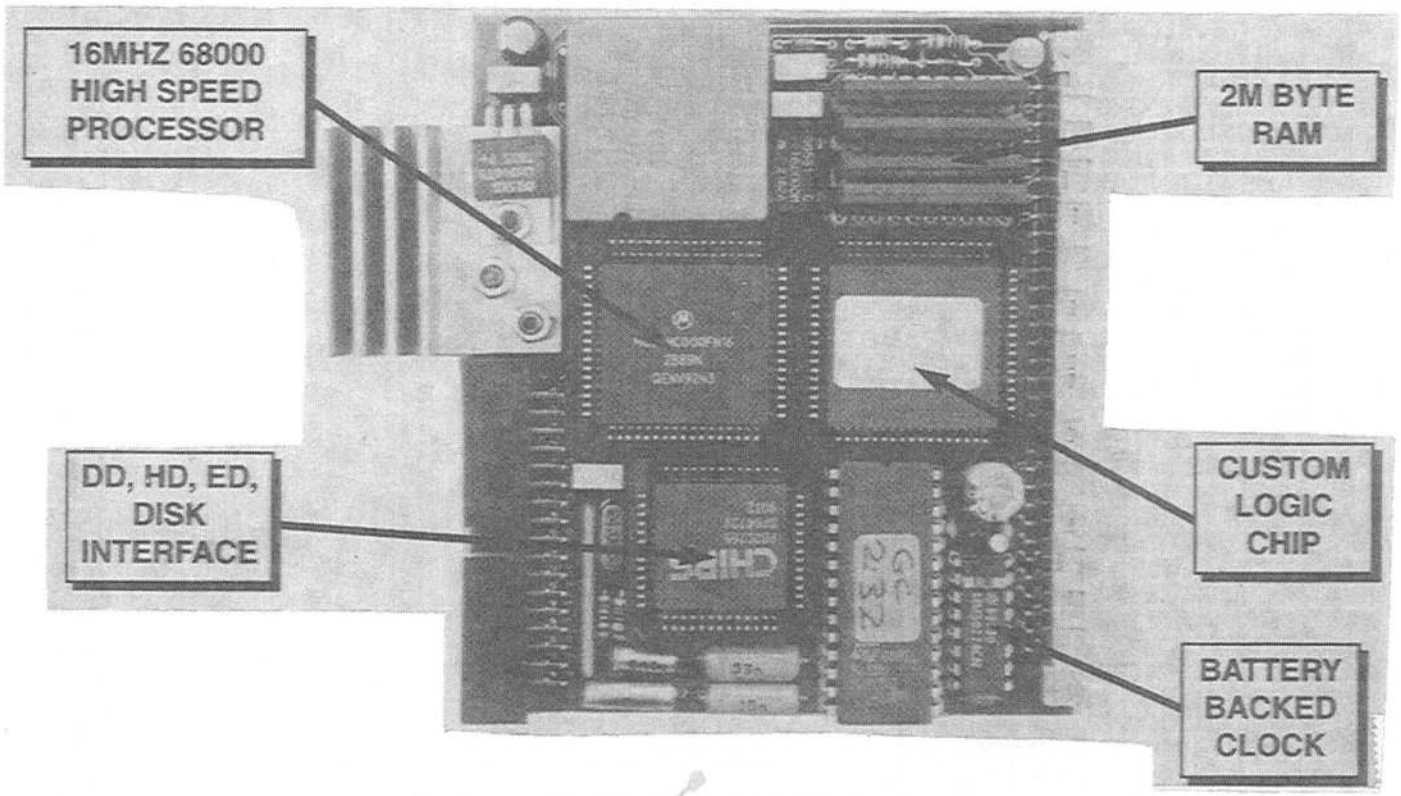

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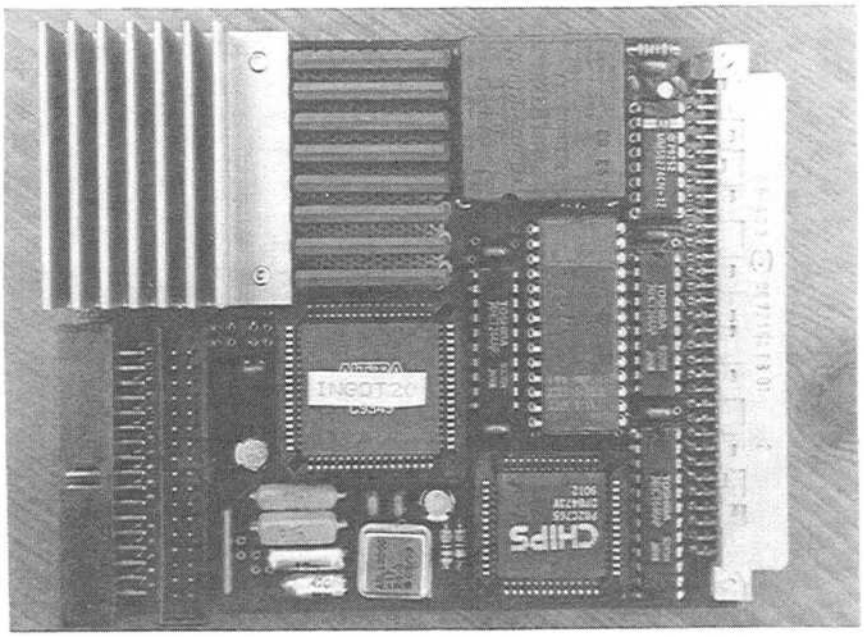

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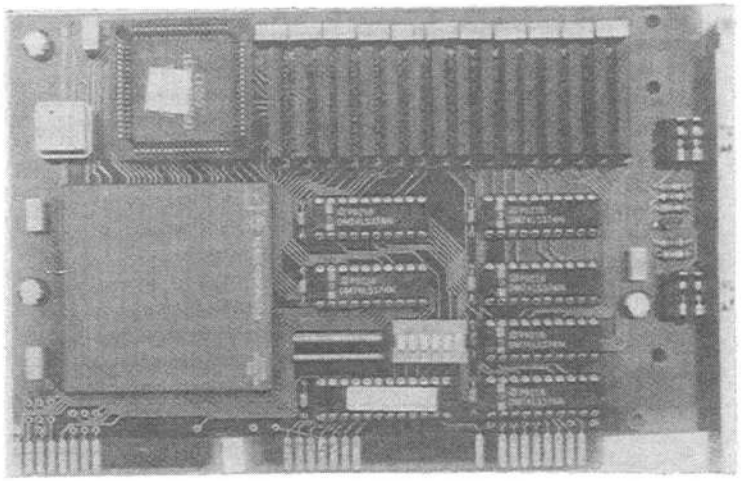

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* *Uses PC's keyboard, floppy & hard disks, parallel/serial ports and mouse.*

This is the card that plugs into a standard 8 or 16 bit ISA slot on a PC and allows the PC to run QL programs - FAST. A new QDOS compatible operating system from Tony Tebby called SMSQ, which is supplied on a disk, includes Toolkit II and gives you the familiar QL environment. SMSQ includes SBASIC a multitasking SuperBasic compatible interpreter.

Installation is simple; plug the QXL into a spare slot and copy 2 files from the supplied disk onto the hard drive and you're ready to go. From the DOS prompt type QXL and the PC will transform itself into a QL before your very eyes. If at any stage you wish to return to DOS just press CTRL-ScrollLock. You can later resume the QL session by typing QXL/ which takes you back to where you left off. For POINTER ENVIRONMENT programs SMSQ can be configured to handle 3 screen resolutions in addition to the standard 512x256 QL screen. Your PC must have EGA or VGA graphics. EGA allows 640x350 whereas VGA also allows 640x480. Most SVGA cards will allow SMSQ to use 800x600 as well.

PRICING:

QXL (4M)	£280 including VAT - (£245 outside EU)
QXL (8M)	£395 including VAT - (£345 outside EU)

or you can send us your GOLD CARD and

£180 including VAT - (£155 outside EU) for a 4M - QXL

£295 including VAT - (£255 outside EU) for a 8M - QXL

You can also deduct a further £15 for a returned QL CENTRONICS and/or £10 for a DISK ADAPTER.

We are happy to accept payment by sterling cheque made payable to "MIRACLE SYSTEMS", or by quoting your MASTERCARD/VISA/SWITCH credit card number and expiry date (SWITCH card holders please also quote issue number).

TELEPHONE/FAX: (01454) 883 602

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